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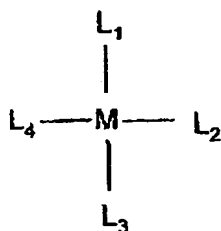


Fig. 1a

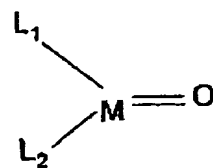


Fig. 1b

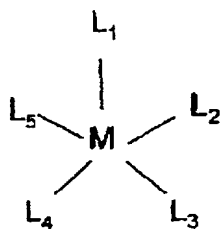


Fig. 1c

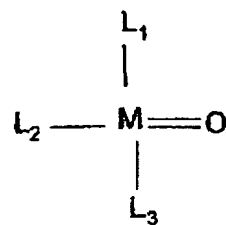
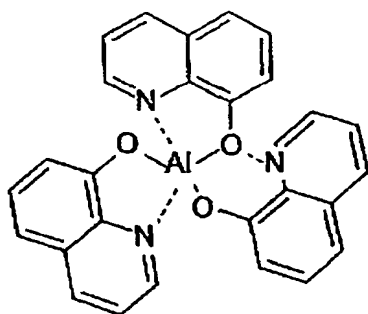


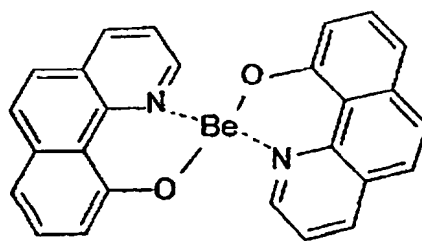
Fig. 1d

Fig. 1

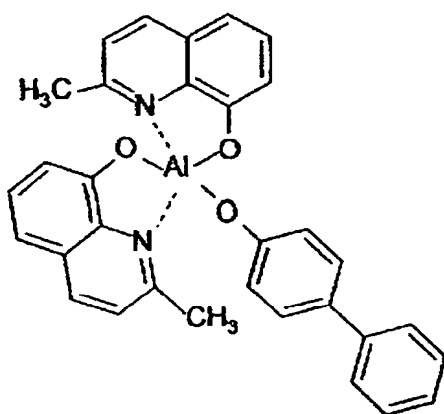
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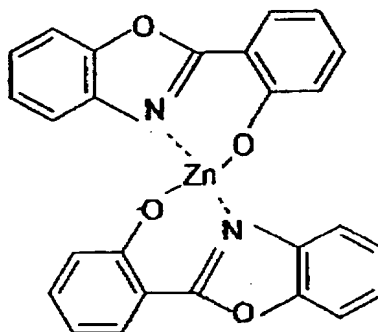
Alq



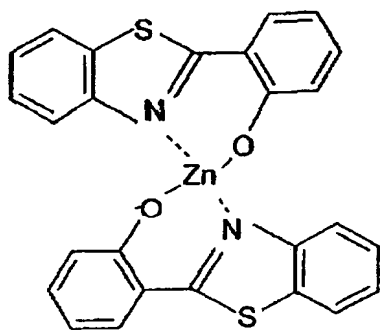
Bebq



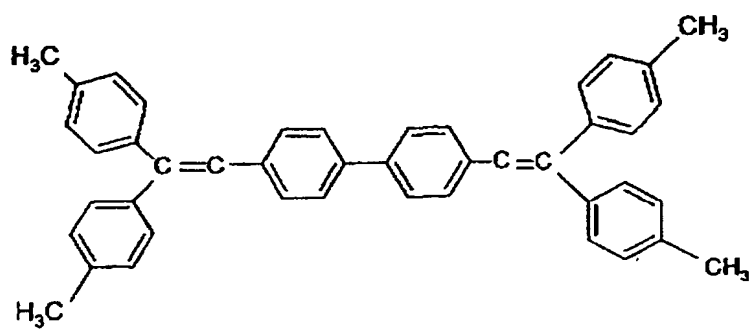
BAq1



ZnPBO



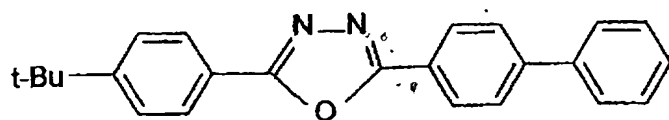
ZnPBT



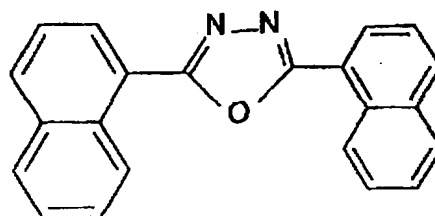
DTVb1

Fig. 2

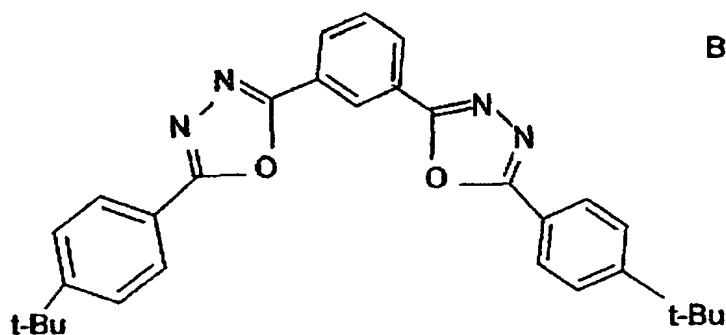
3/49



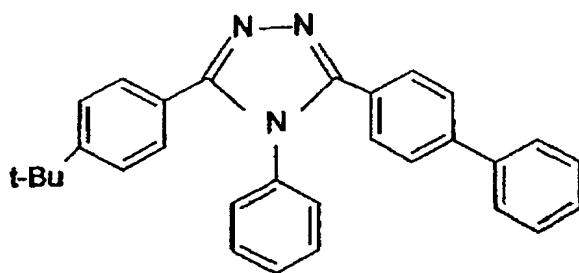
t-Bu-PBD



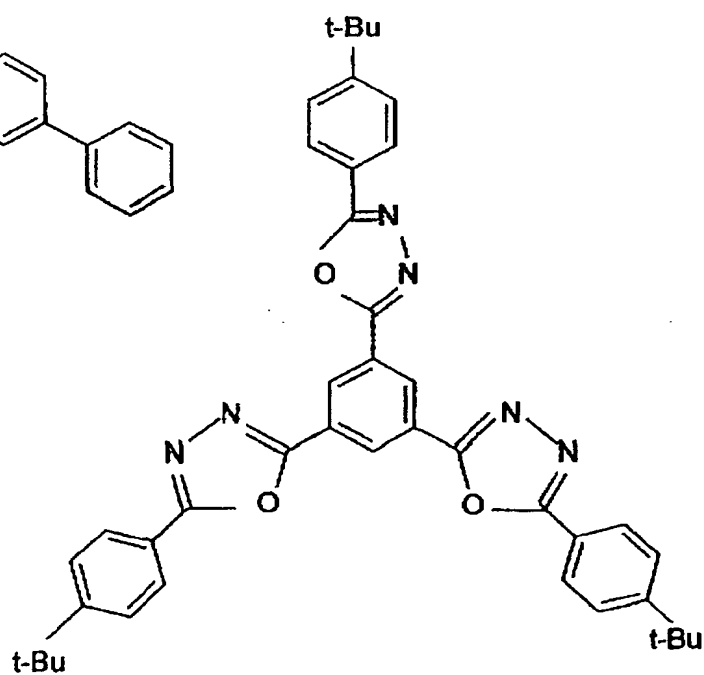
BND



OXD-7



TAZ



OXD-Star

Fig. 3

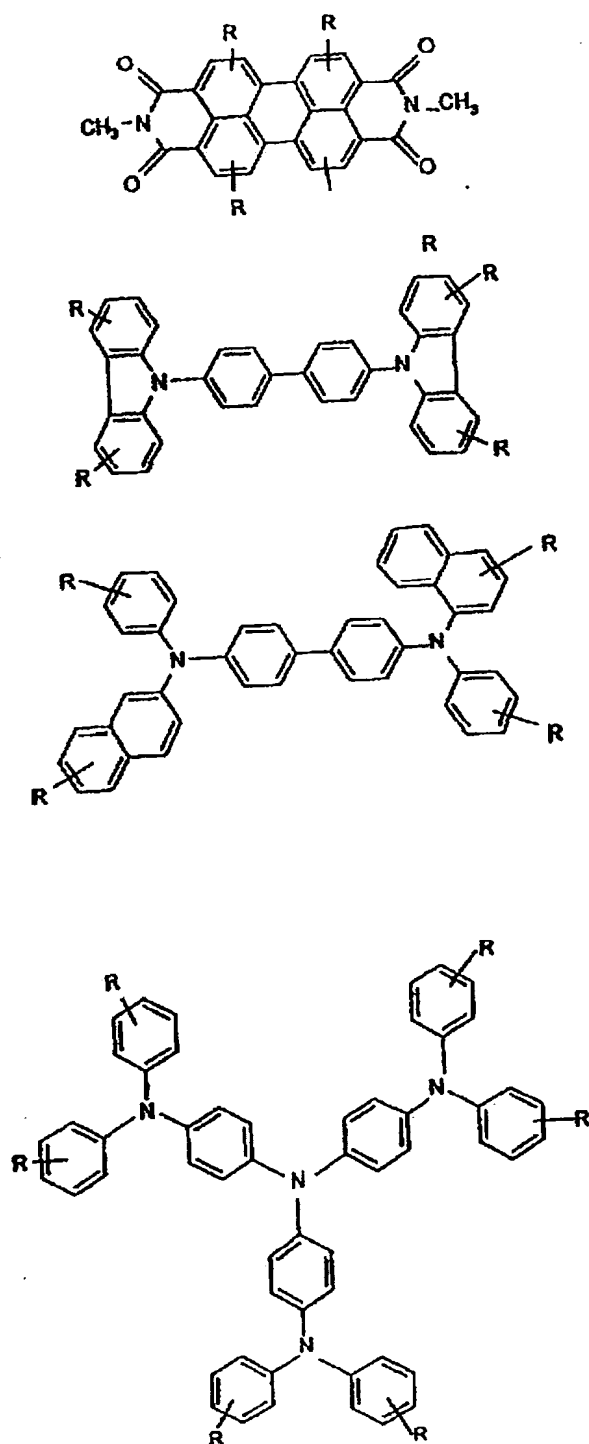


Fig. 4

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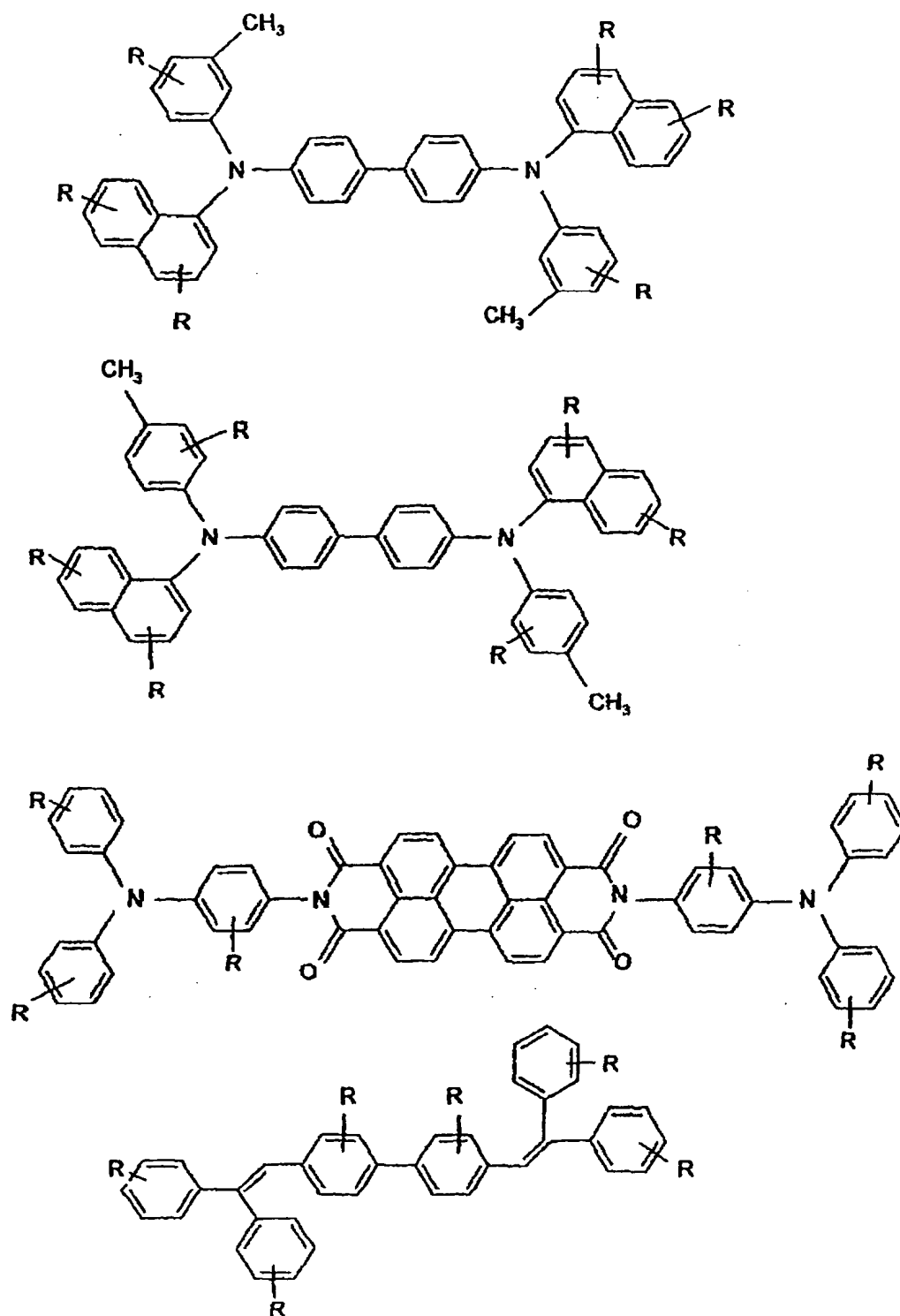


Fig. 5

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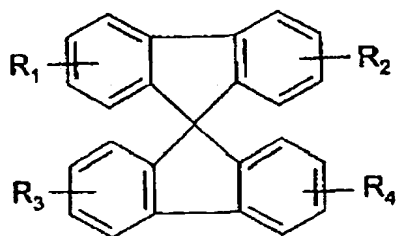


Fig. 14a

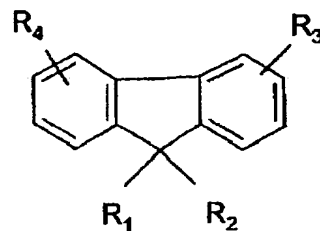
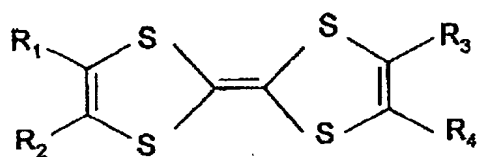


Fig. 14b



or

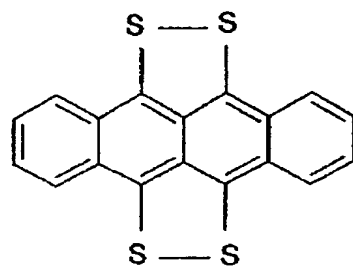
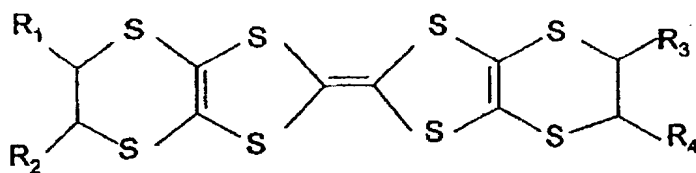


Fig. 6

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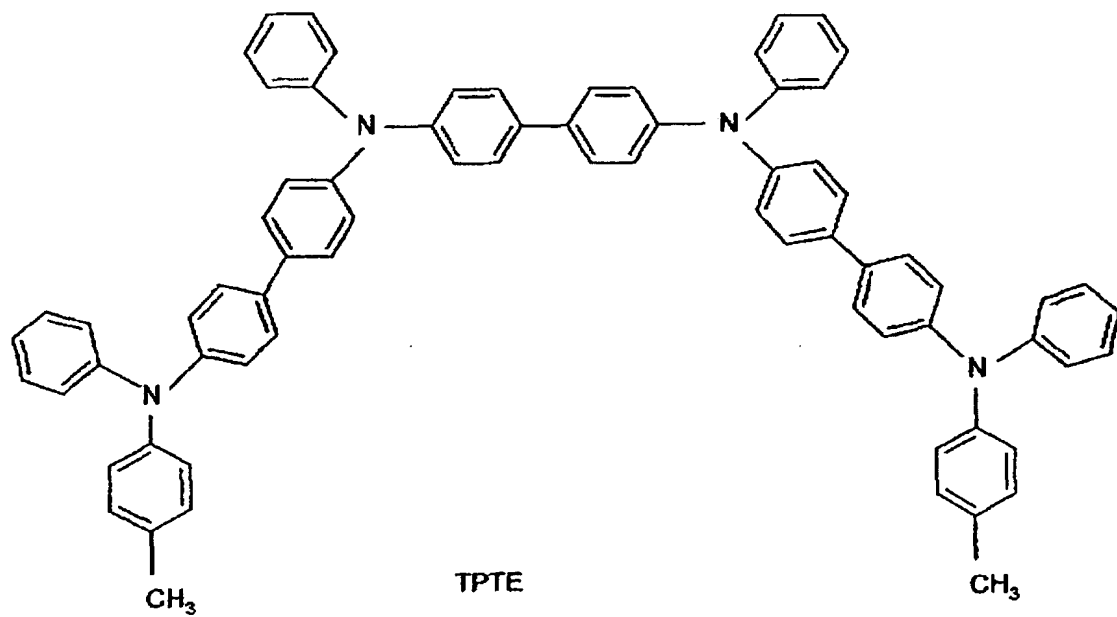
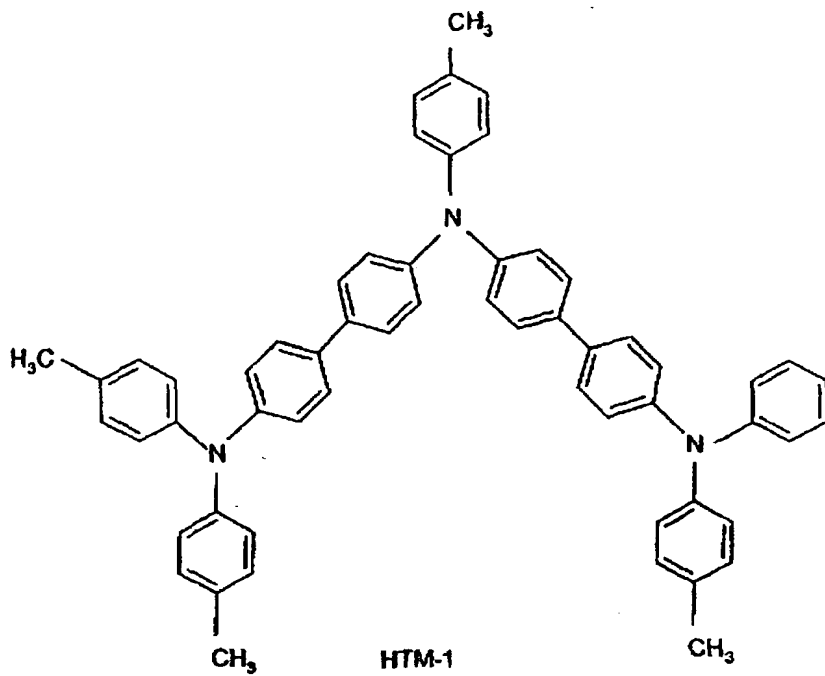
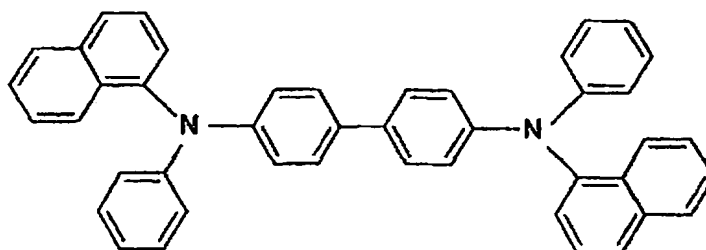
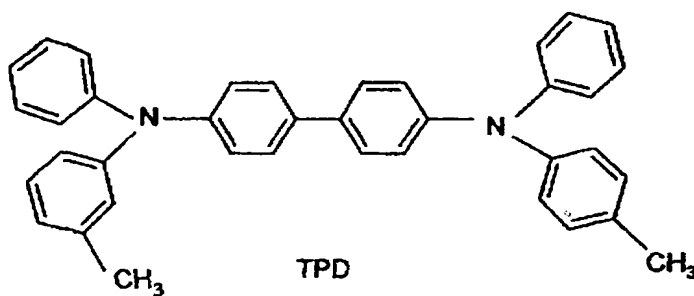
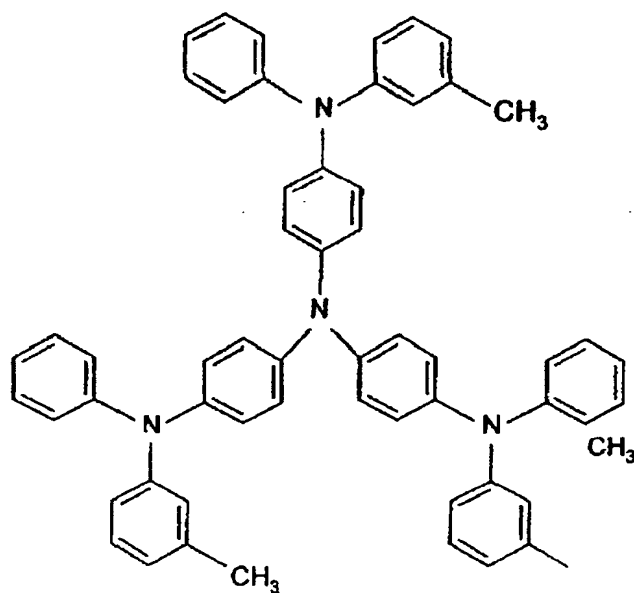


Fig. 7

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 α -NPB

TPD



mTADATA

Fig. 8

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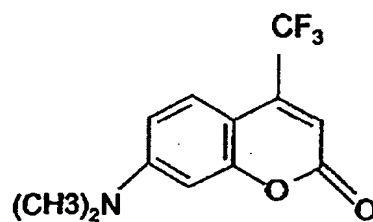
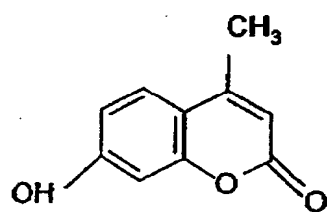
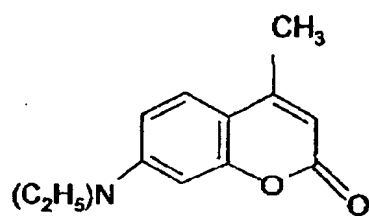
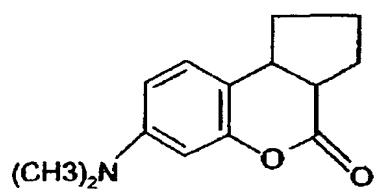
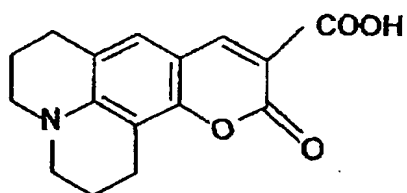
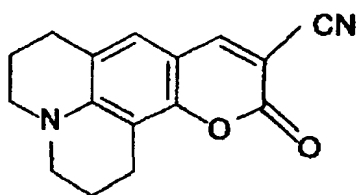
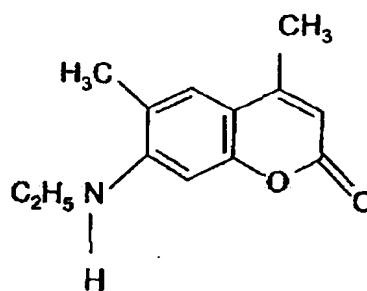
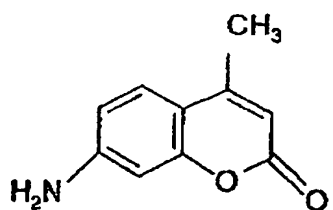


Fig. 9

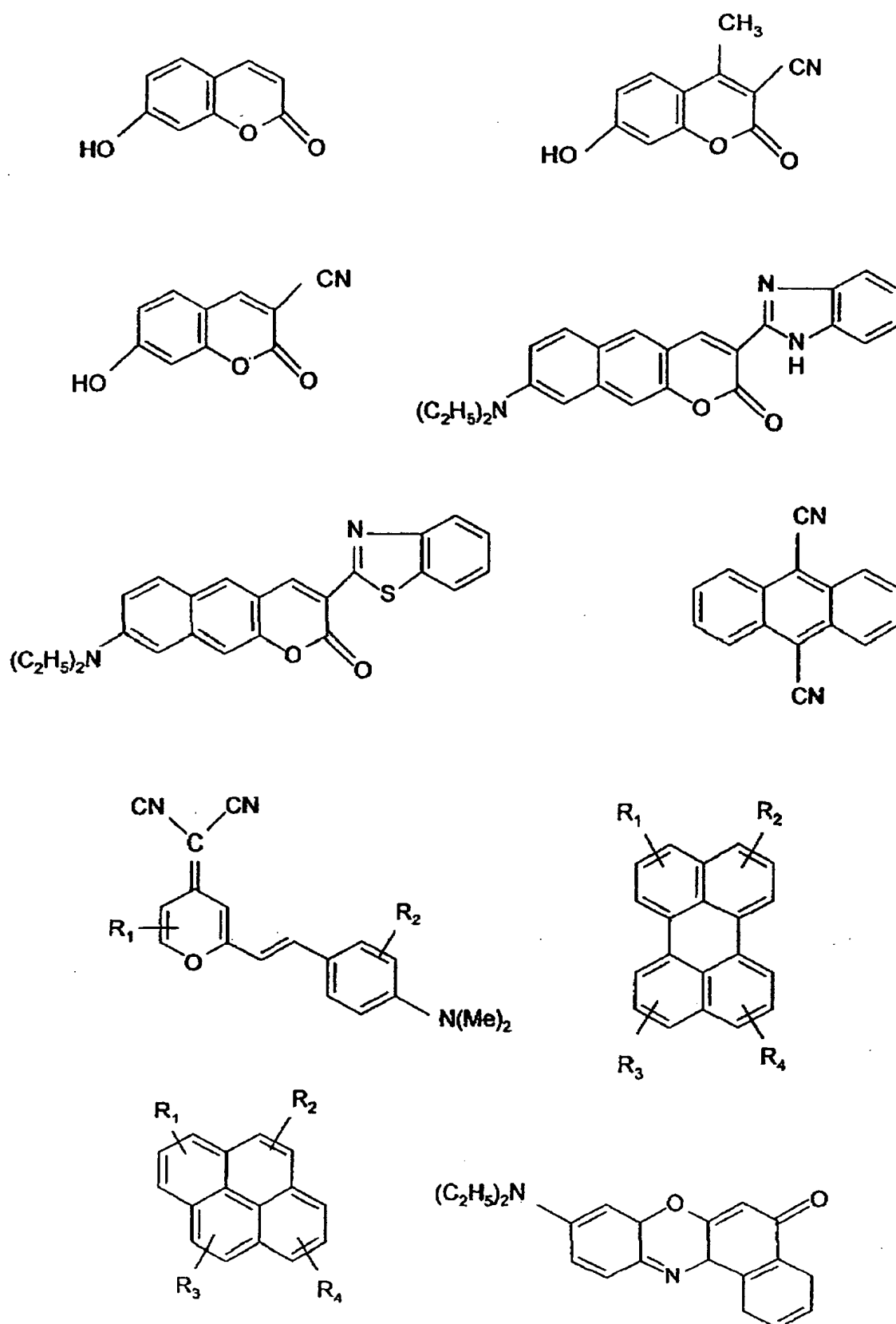


Fig. 10

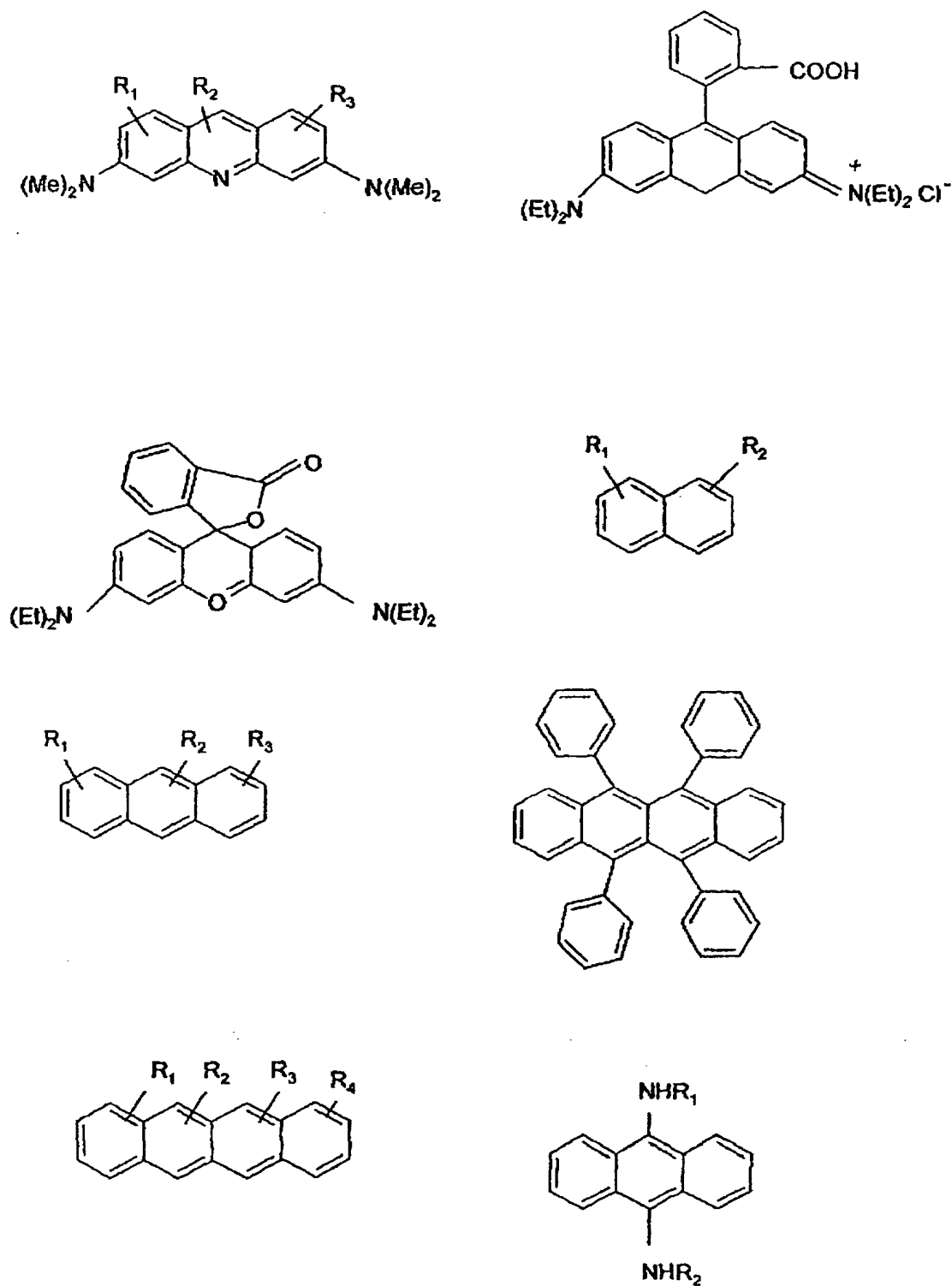


Fig. 11

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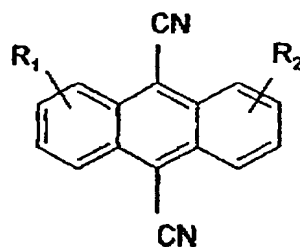
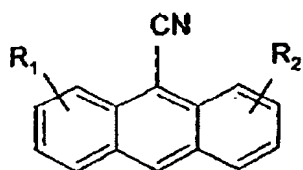
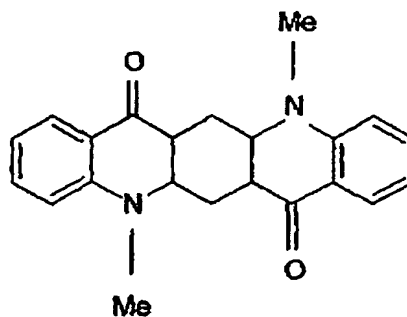
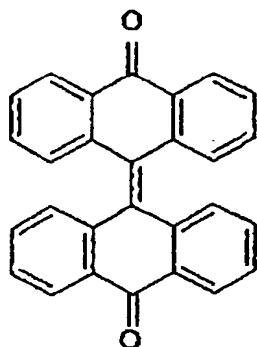
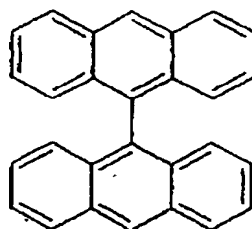
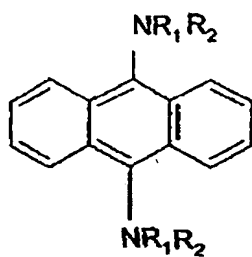


Fig. 12

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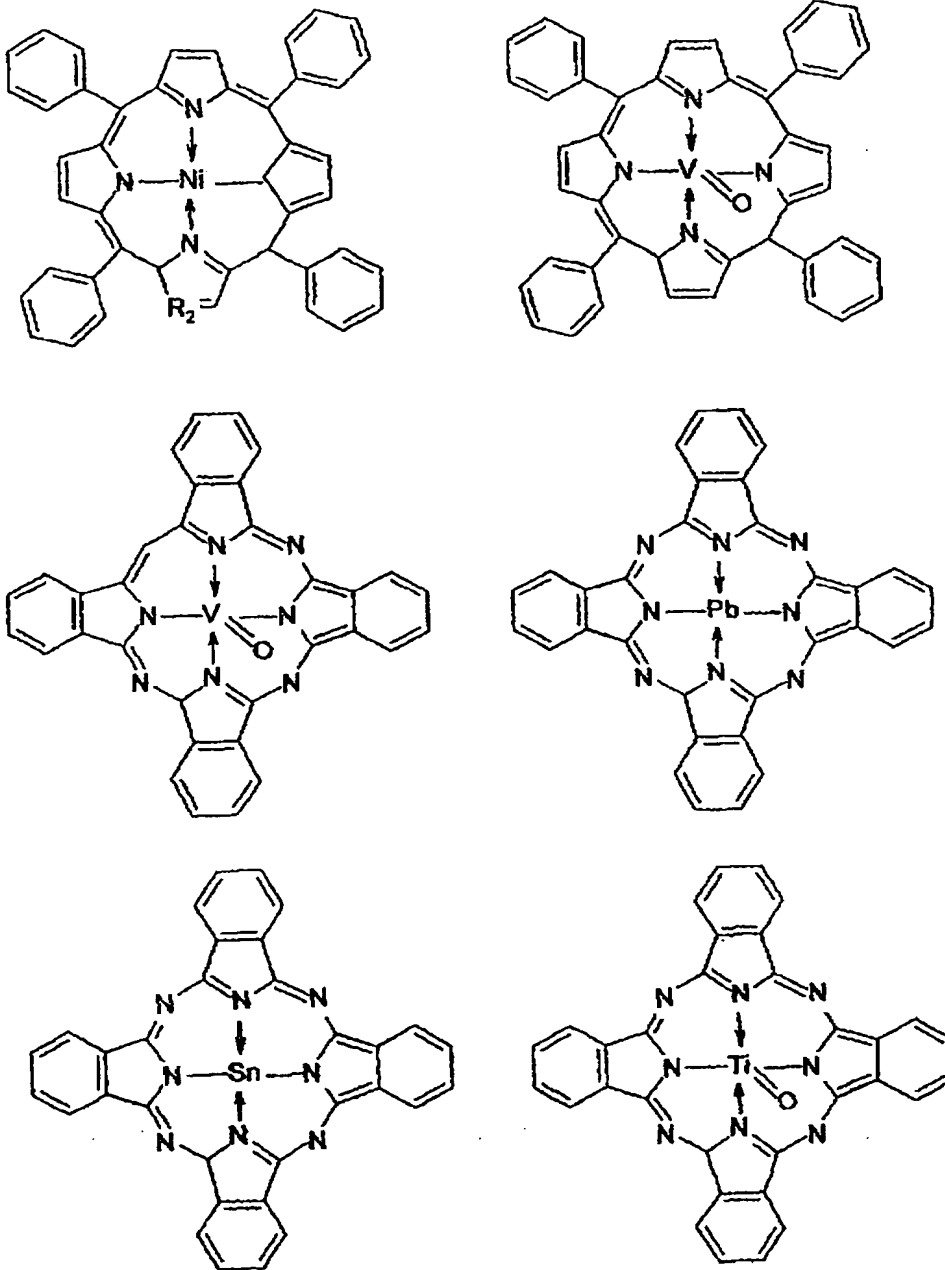


Fig. 13

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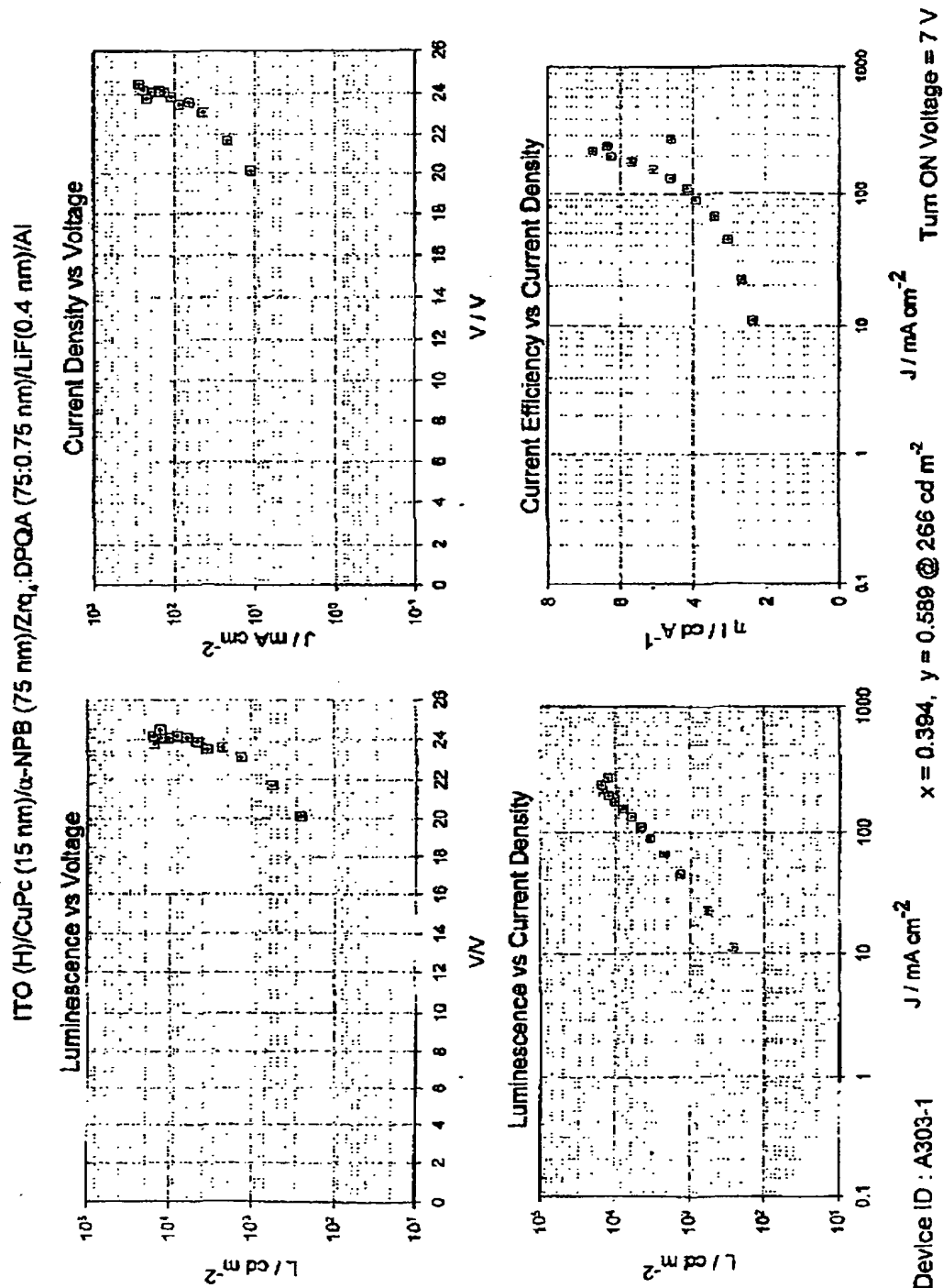


Fig. 14

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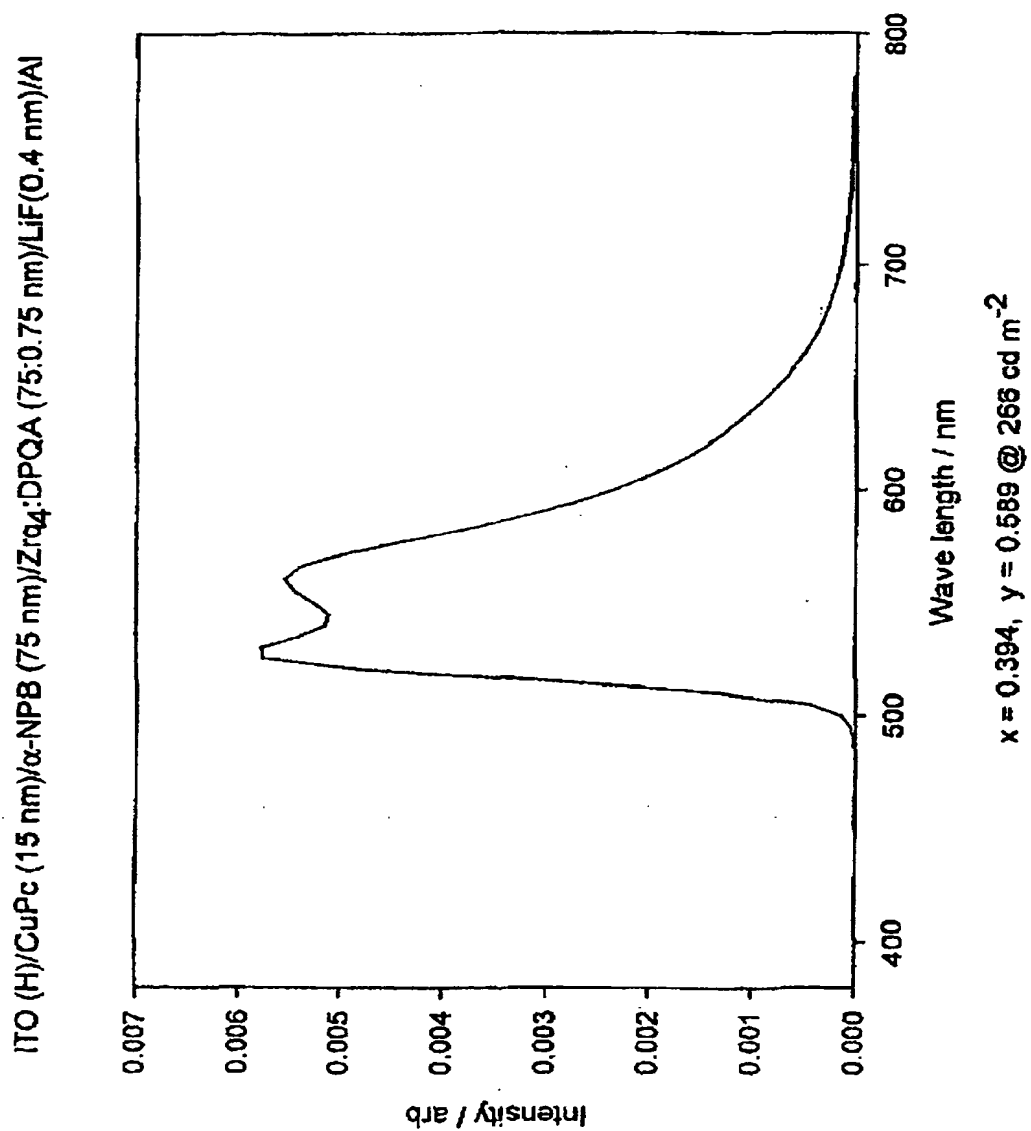
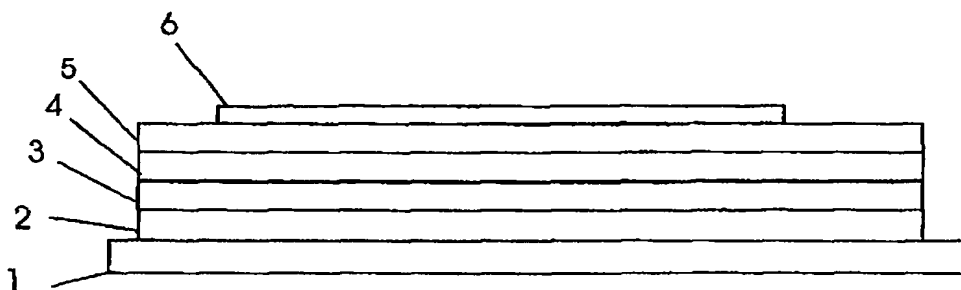


Fig. 15

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1 is ITO; 2 is CuPC; 3 is α -NPB; 4 is Zr_q; DPQA; 5 is LiF and 6 is Al.

Fig. 16

Fig. 17

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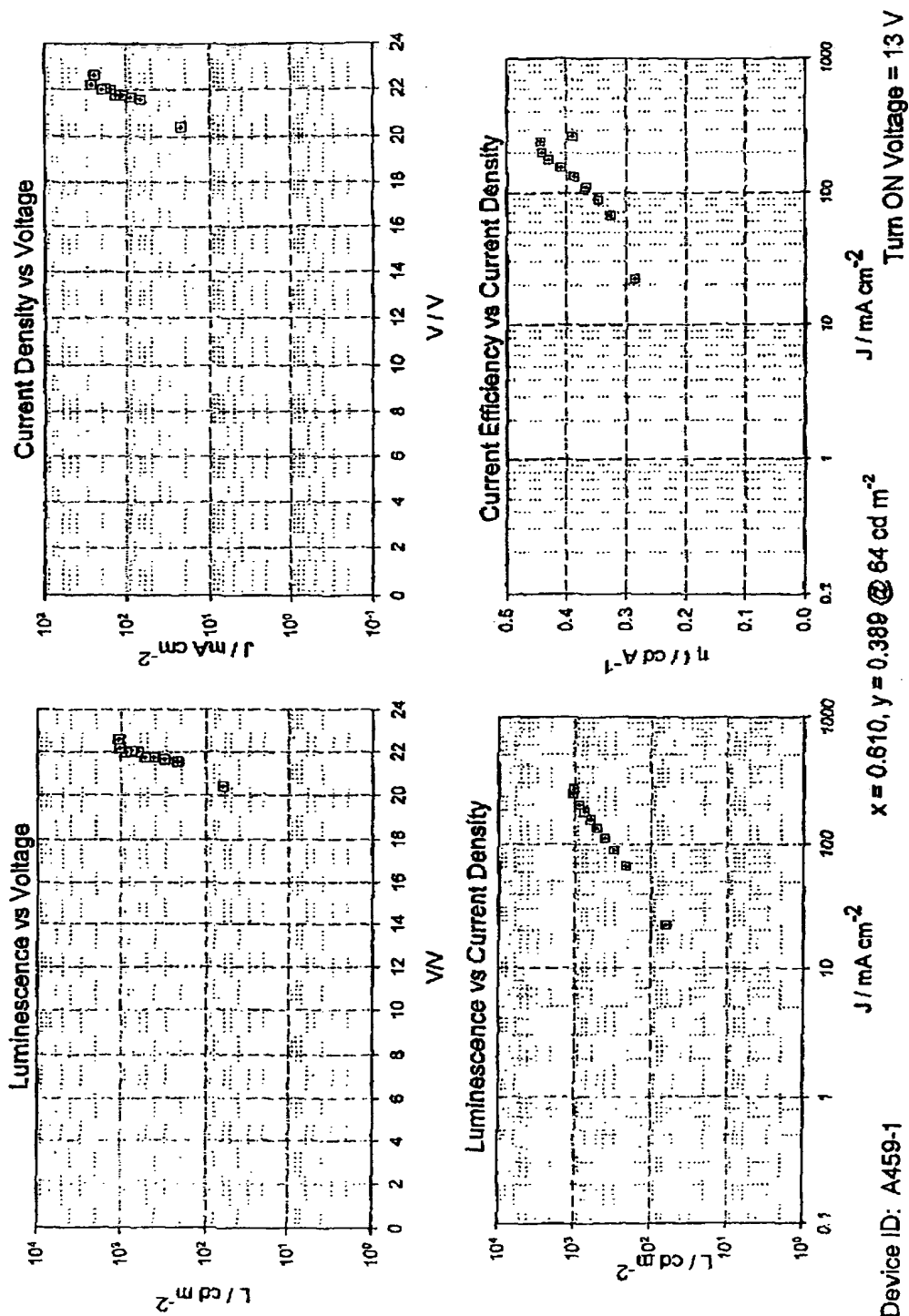
ITO (H)/ CuPc (25 nm)/ α -NPB (75 nm)/Zrq₂:Nlired (75:0.38 nm)/LIF (0.4 nm)/Al

Fig. 18

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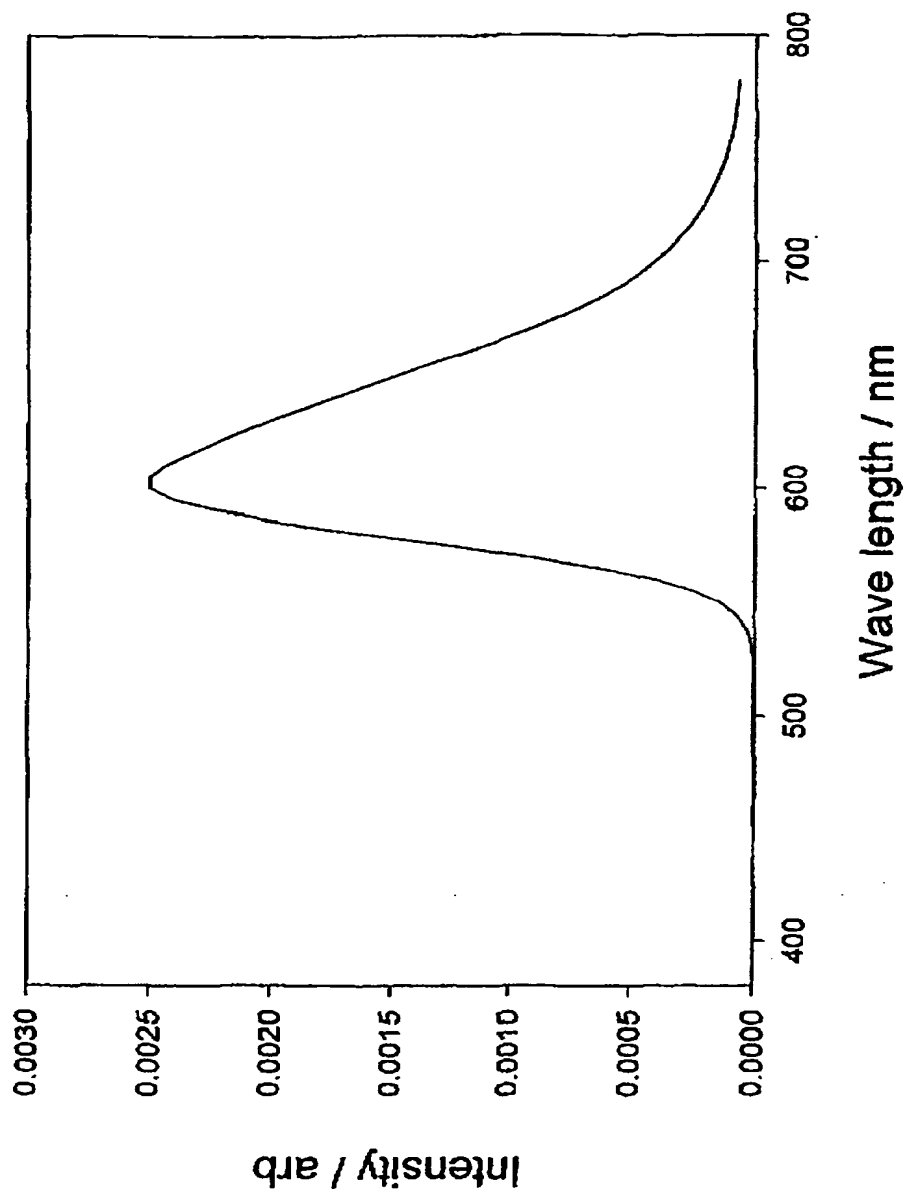
ITO (H)/ CuPc (25 nm)/ α -NPB (75 nm)/ZrO₂:Nirered (75:0.38 nm)/LiF (0.4 nm)/Al $x = 0.610, y = 0.389 @ 64 \text{ cd m}^{-2}$

Fig. 19

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ITO (H)/CuPc (25 nm)/ α -NPB (75 nm)/Zr_q:DPOA(60:0.4 nm)/Zr_q (10 nm)/LIF (0.4 nm)/Al

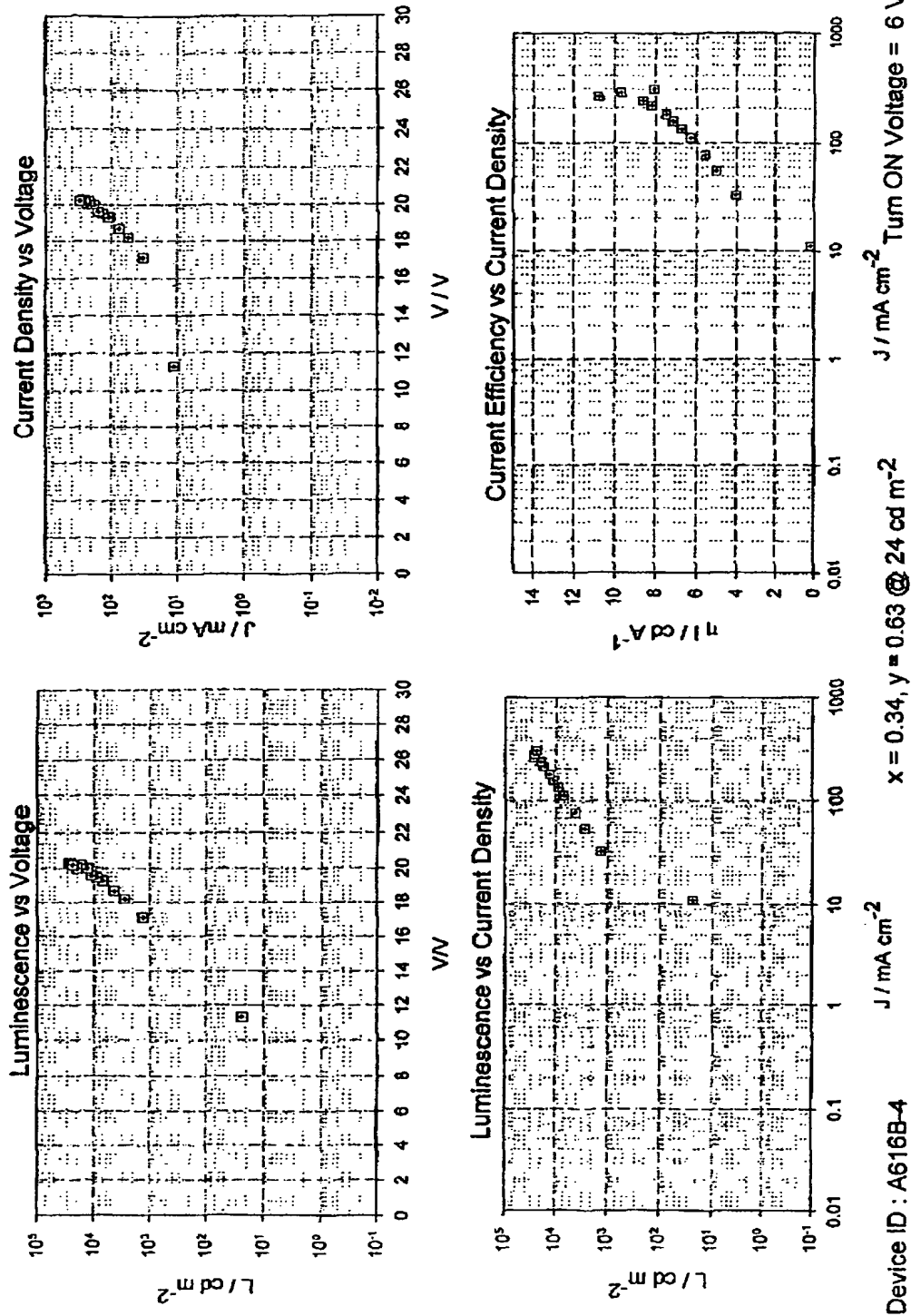


Fig. 20

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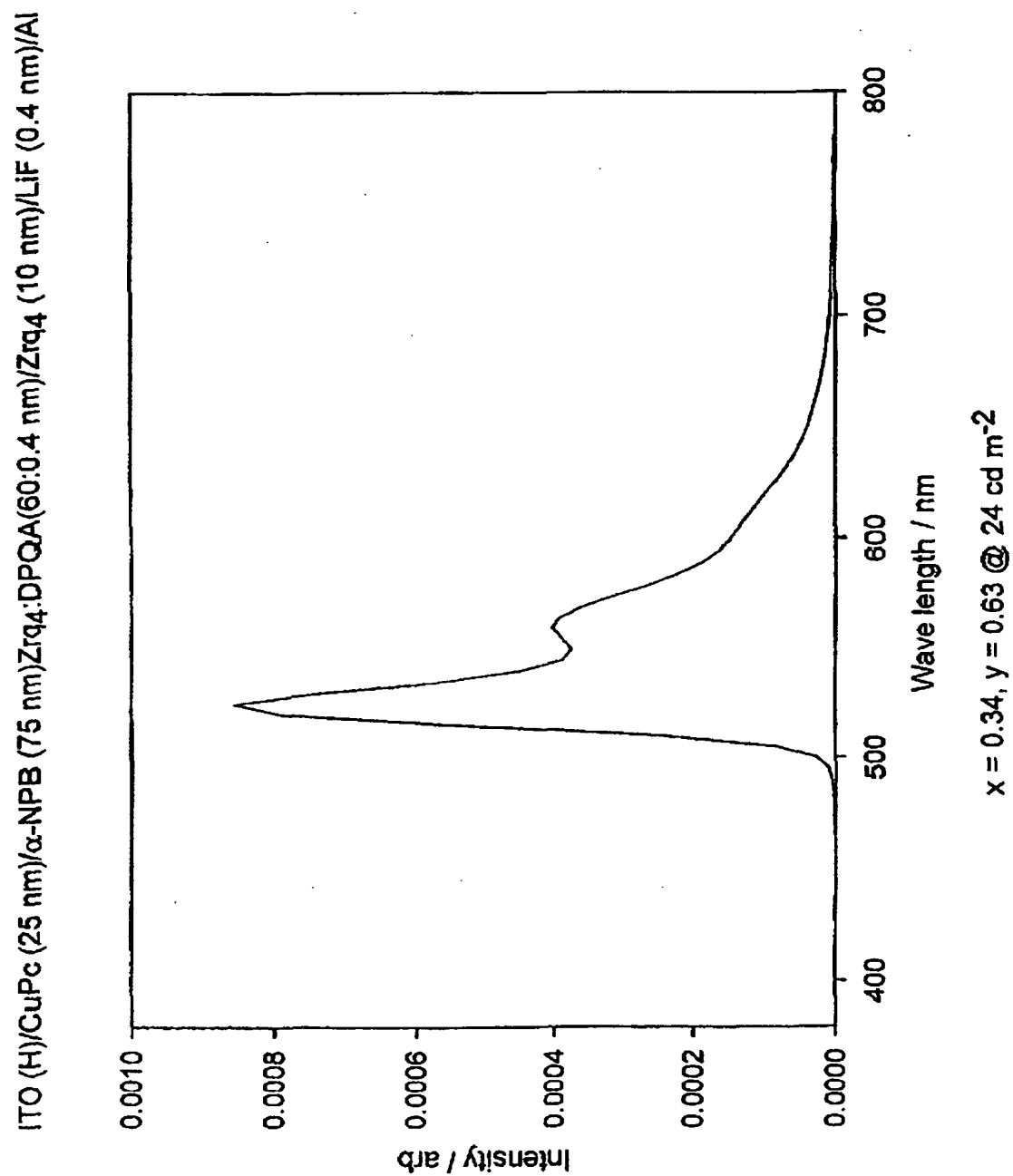
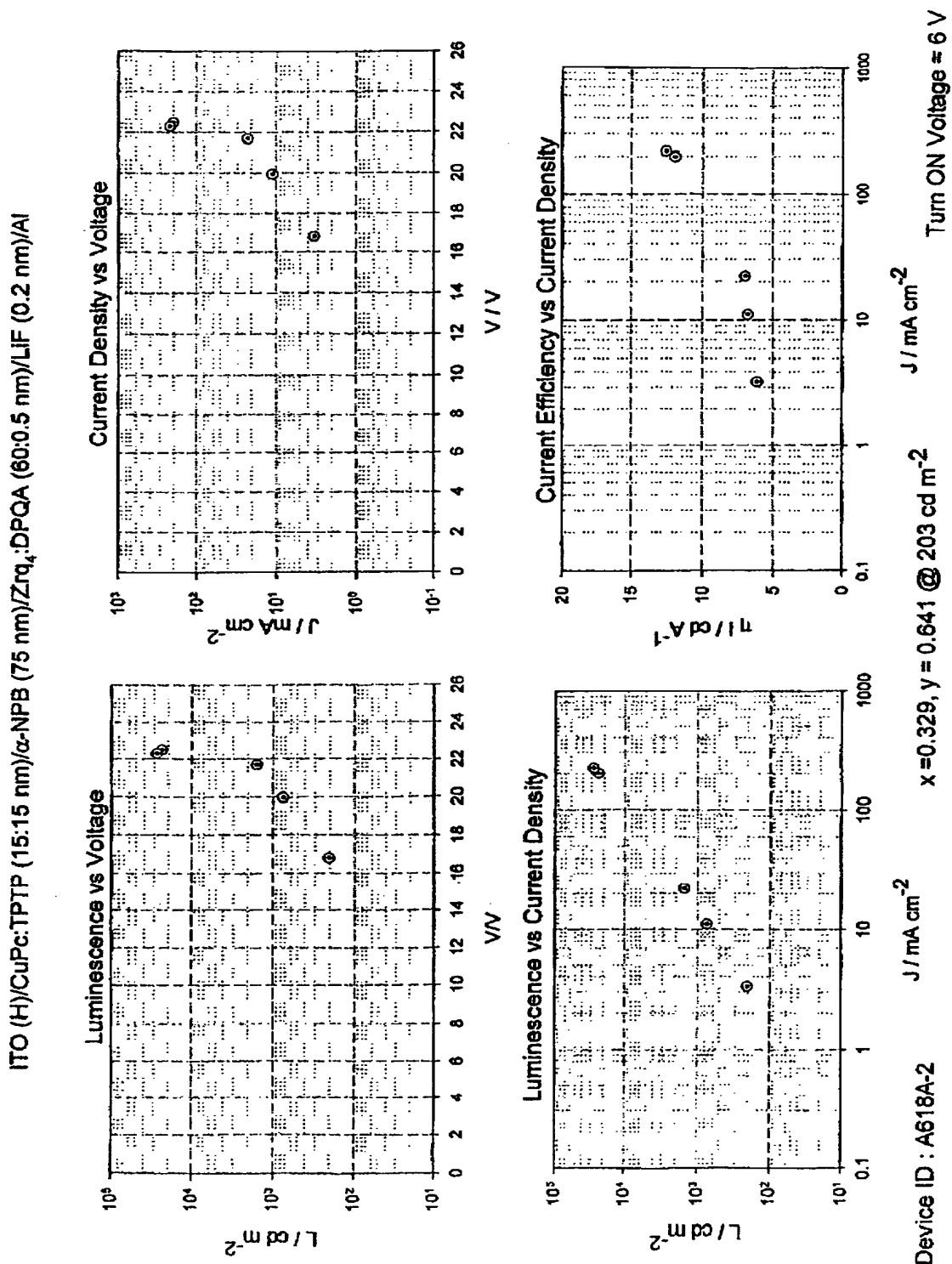


Fig. 21



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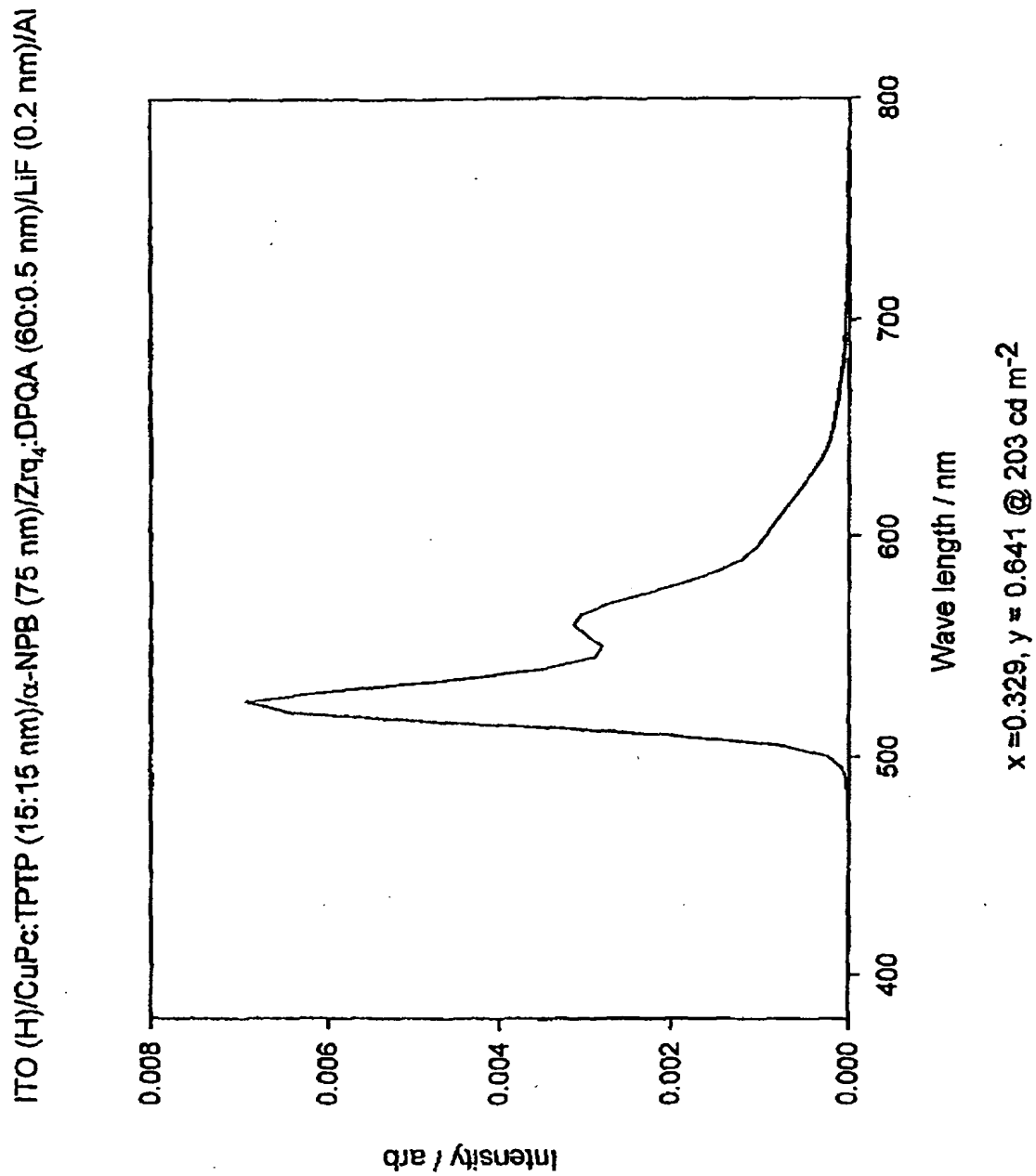


Fig. 23

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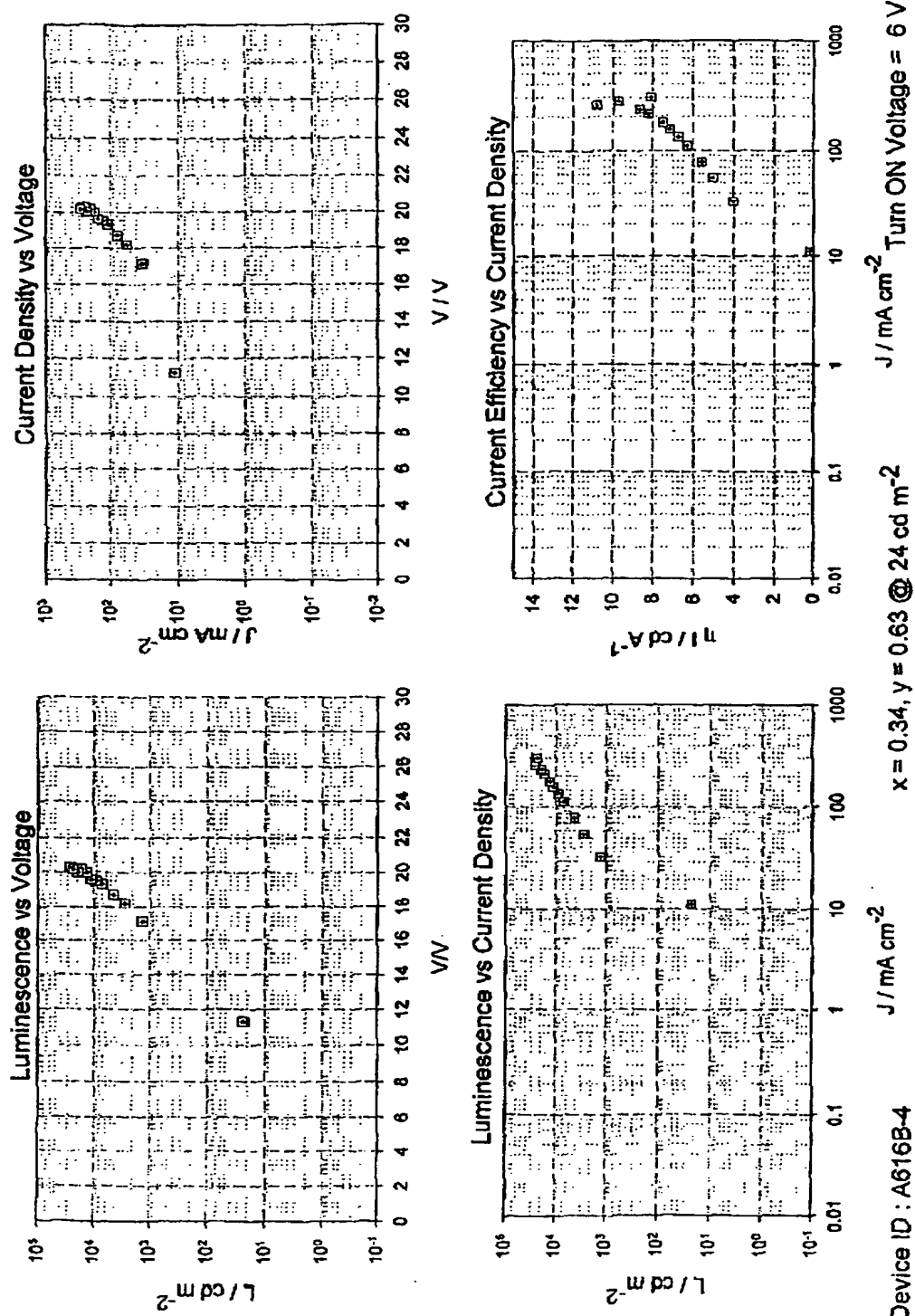
ITO (H)/CuPc (25 nm)/ α -NPB (75 nm)/Zr₄:DPQA(60:0.4 nm)/Zr₄ (10 nm)/LIF (0.4 nm)/Al

Fig. 24

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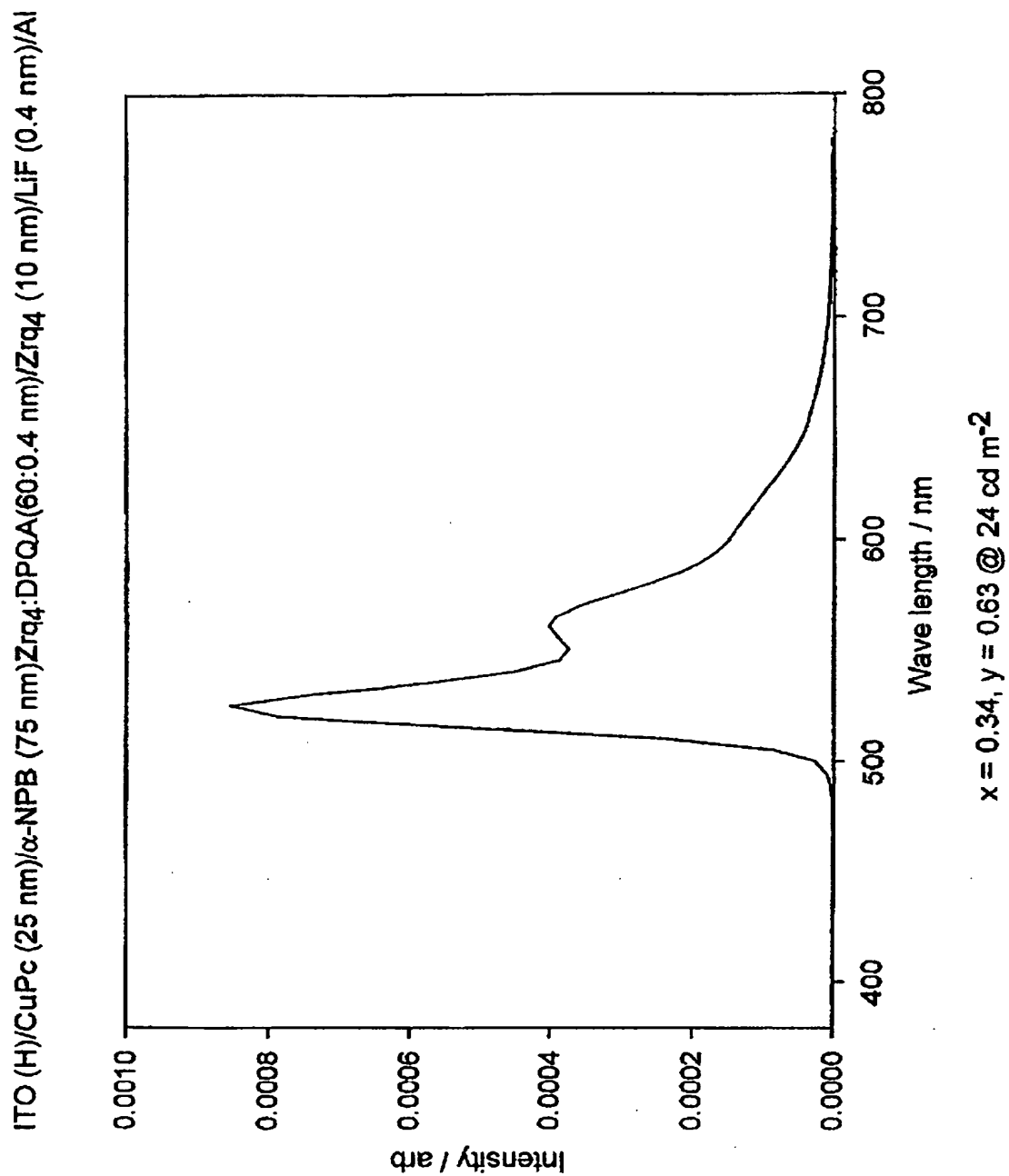


Fig. 25

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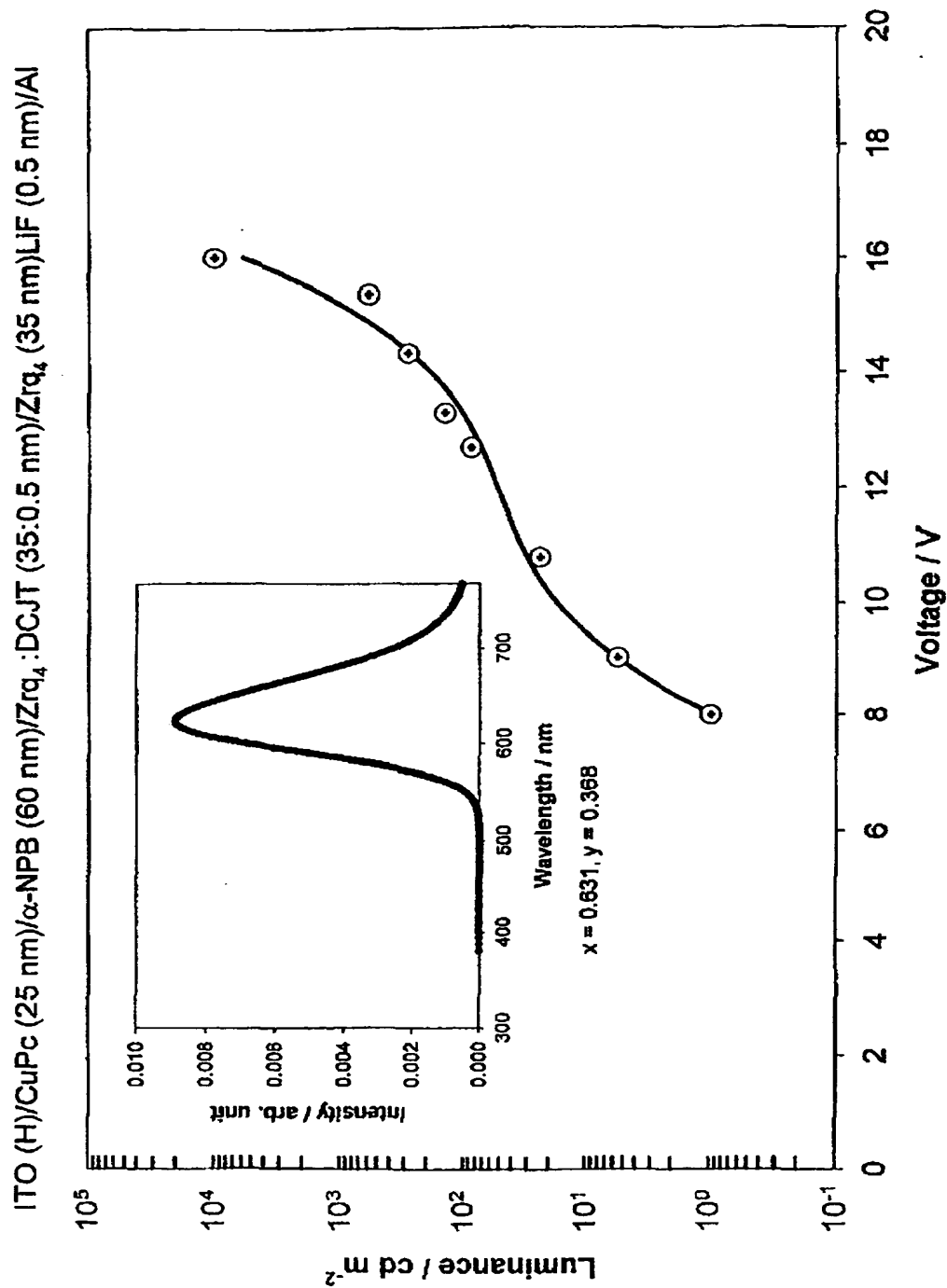


Fig. 26

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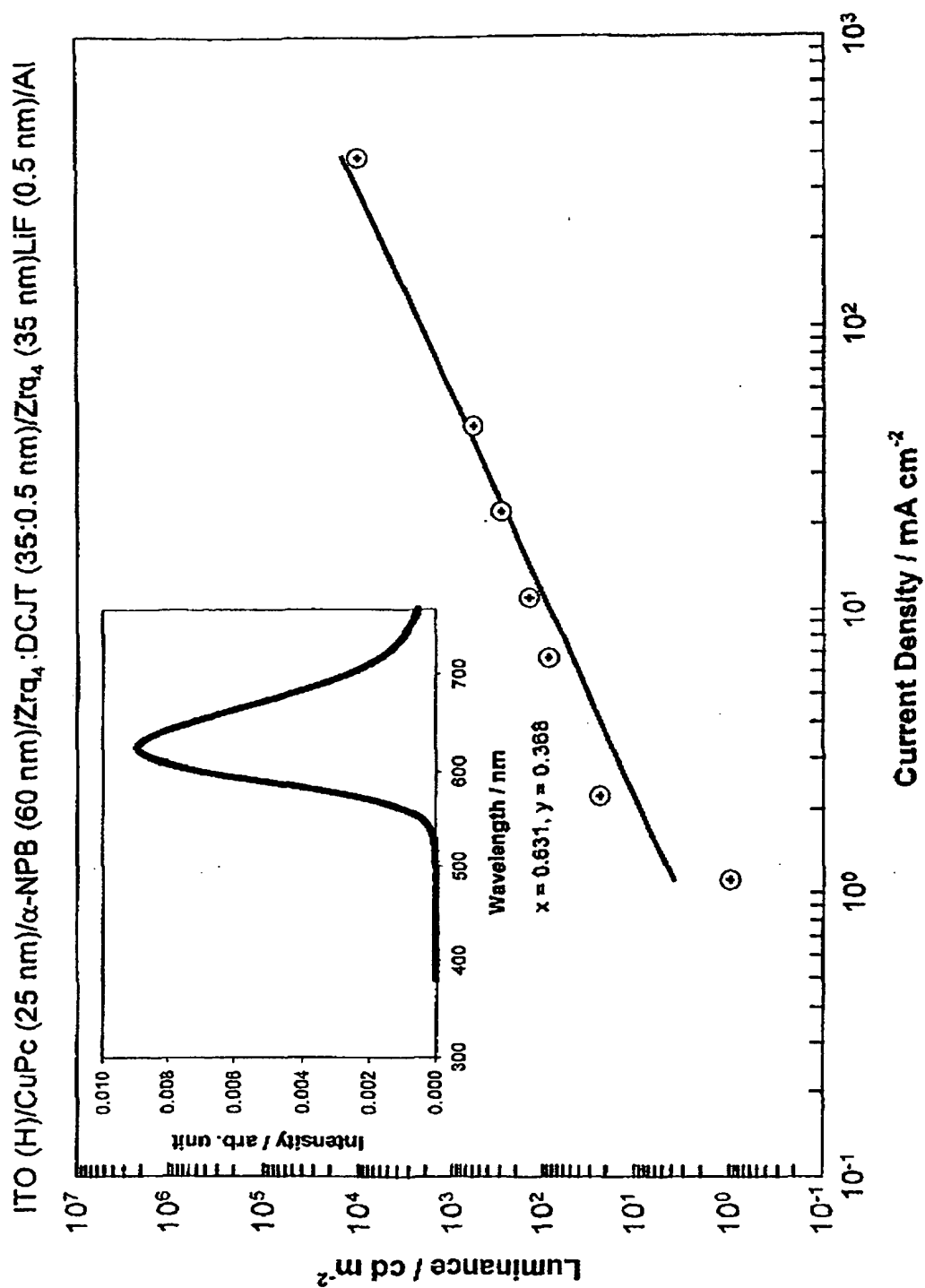


Fig. 27

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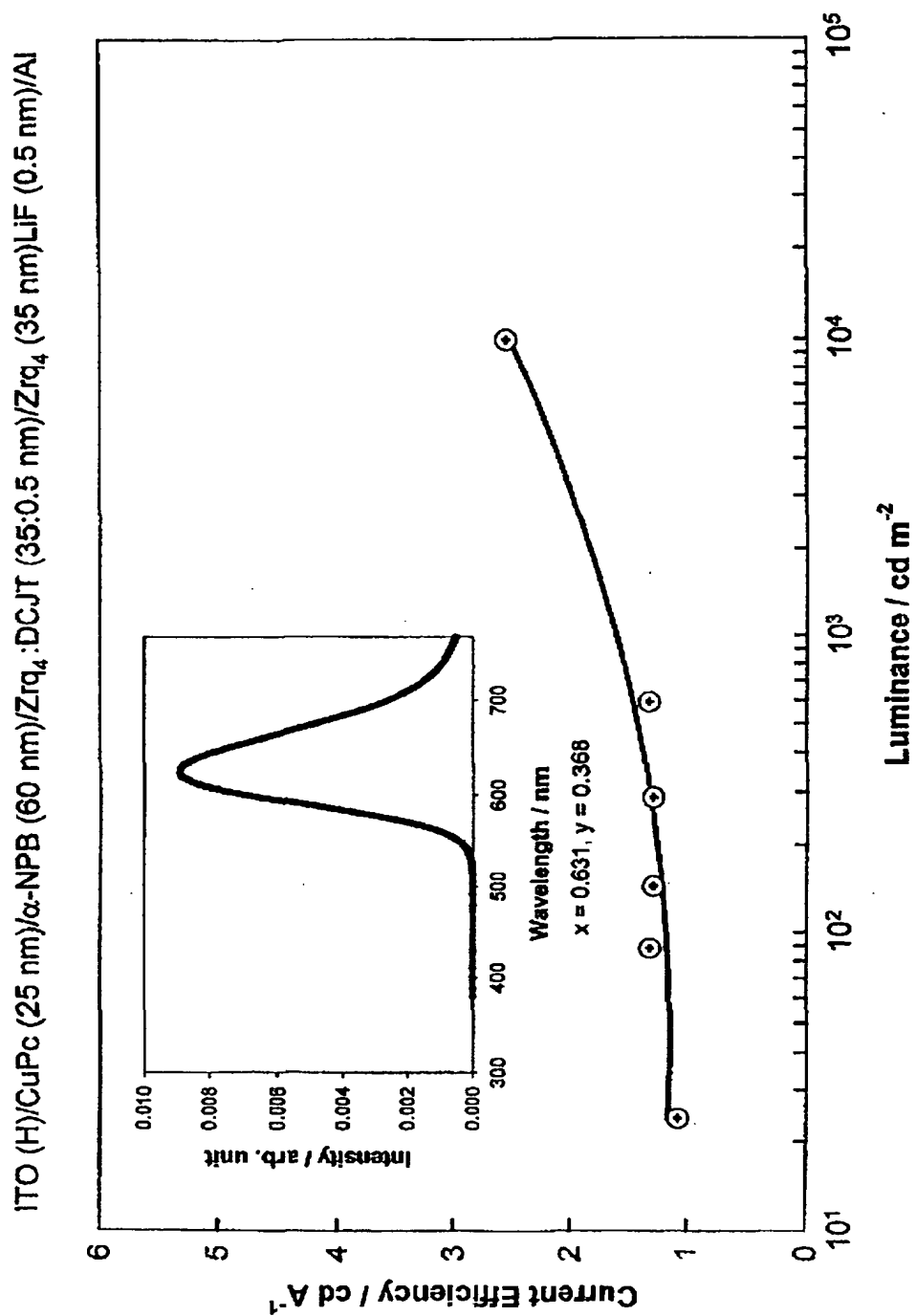


Fig. 28

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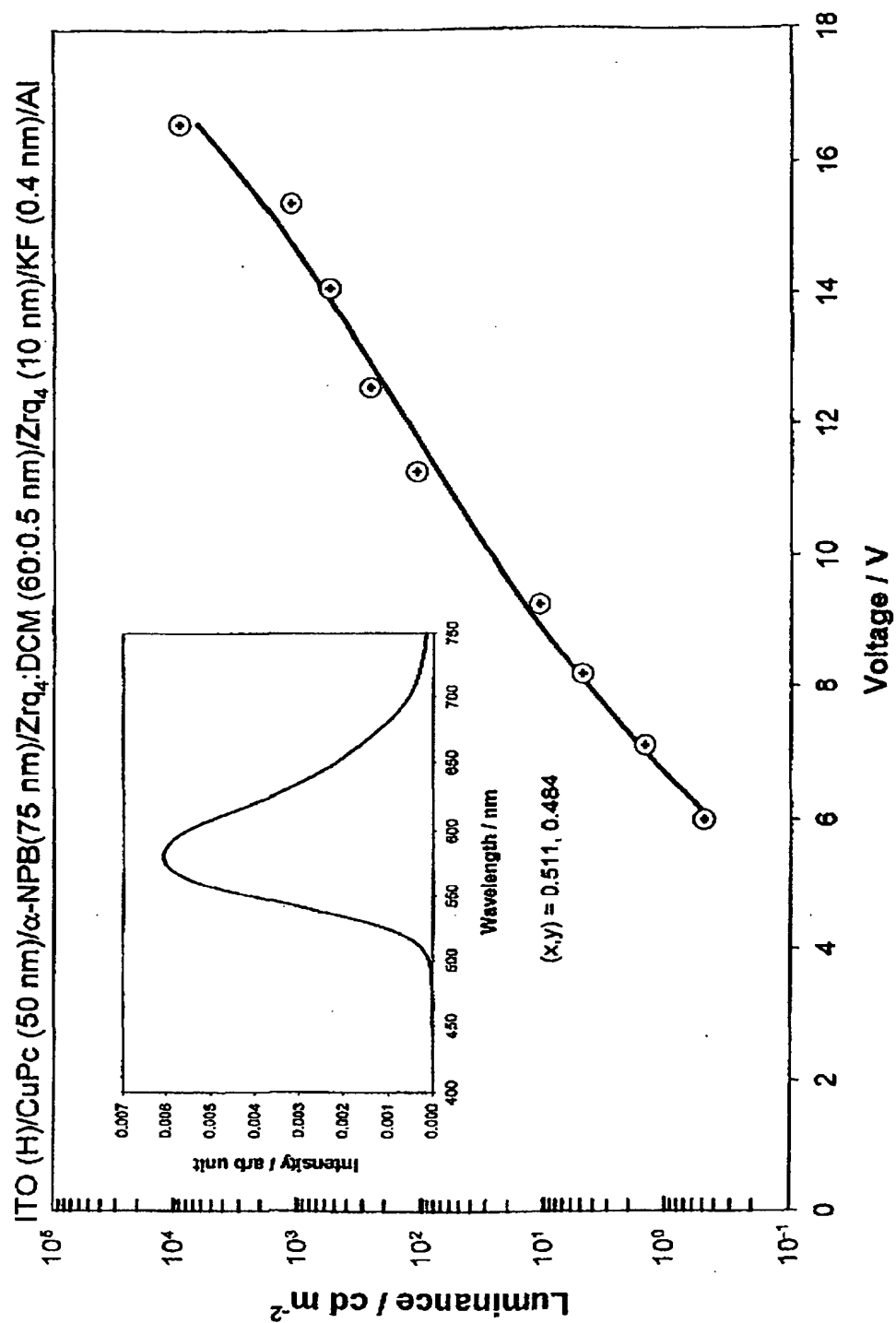


Fig. 29

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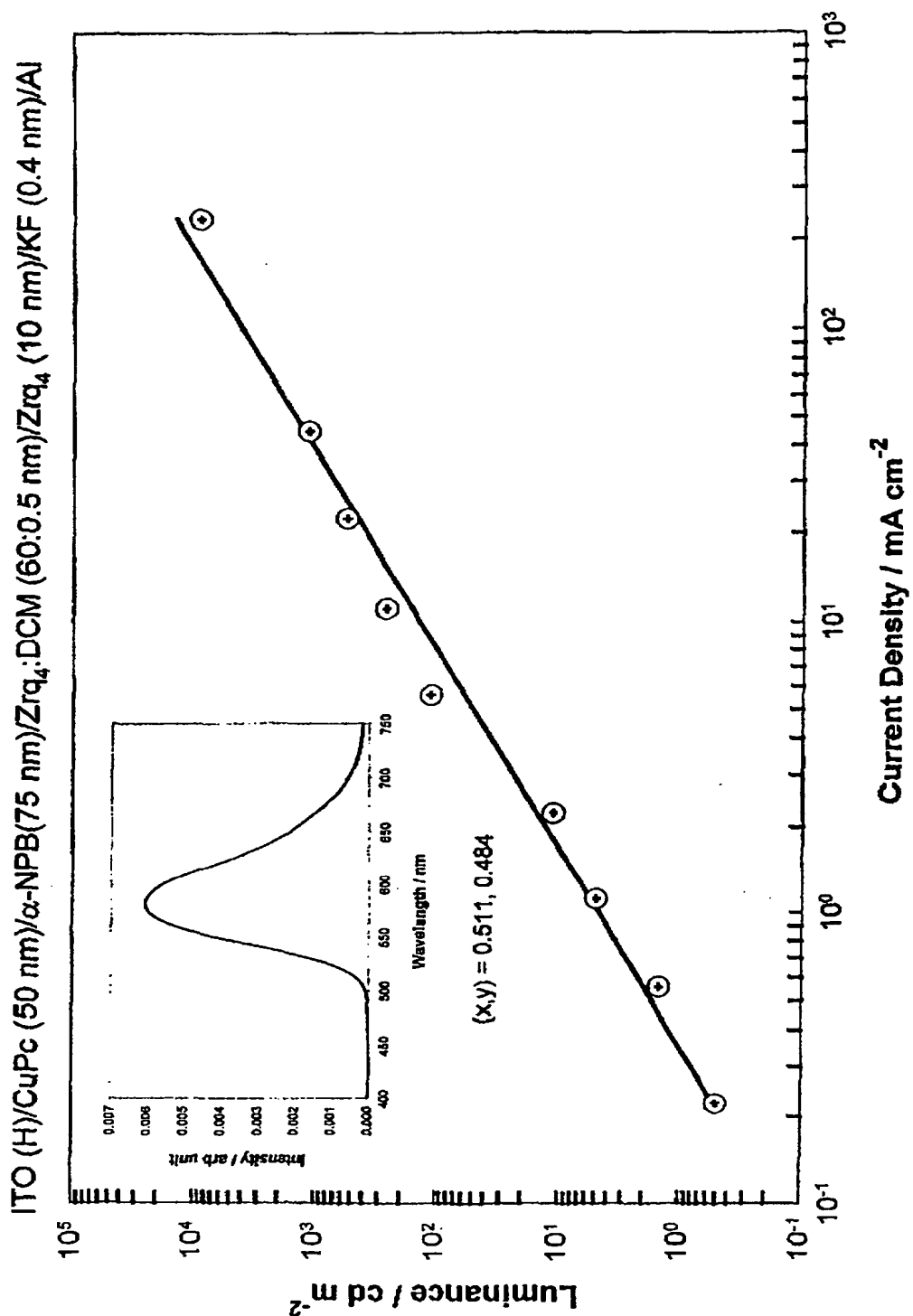


Fig. 30

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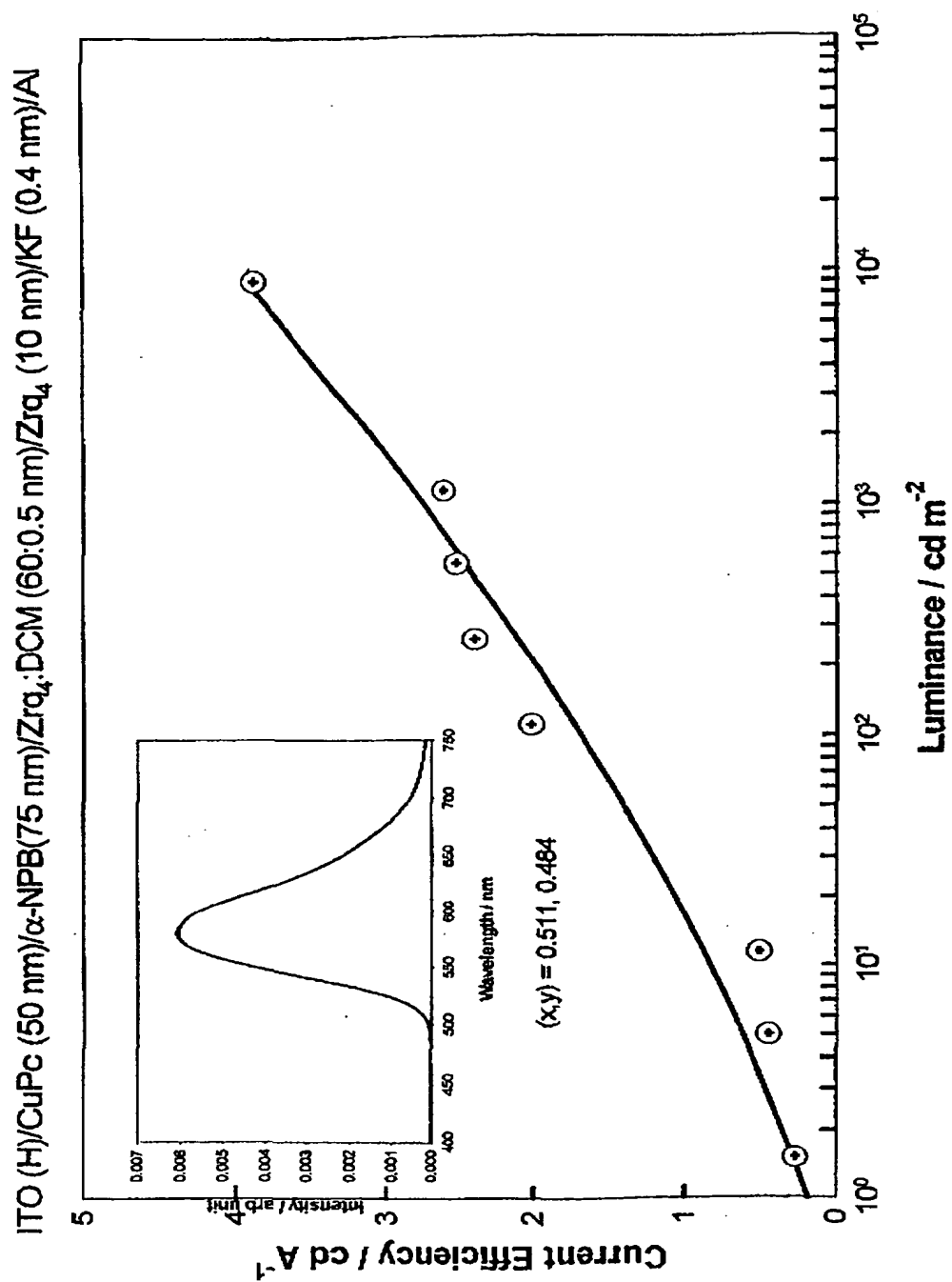


Fig. 31

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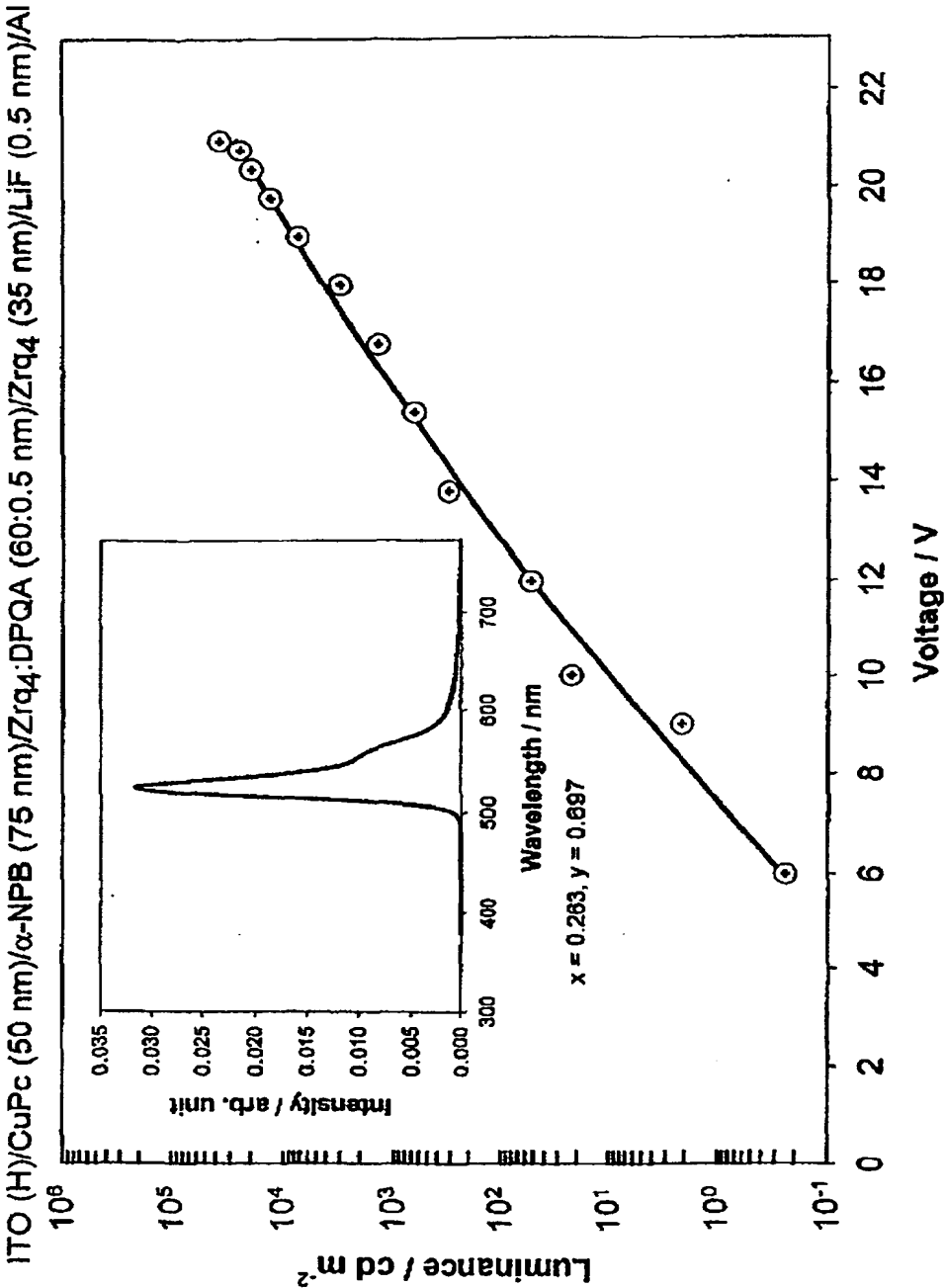


Fig. 32

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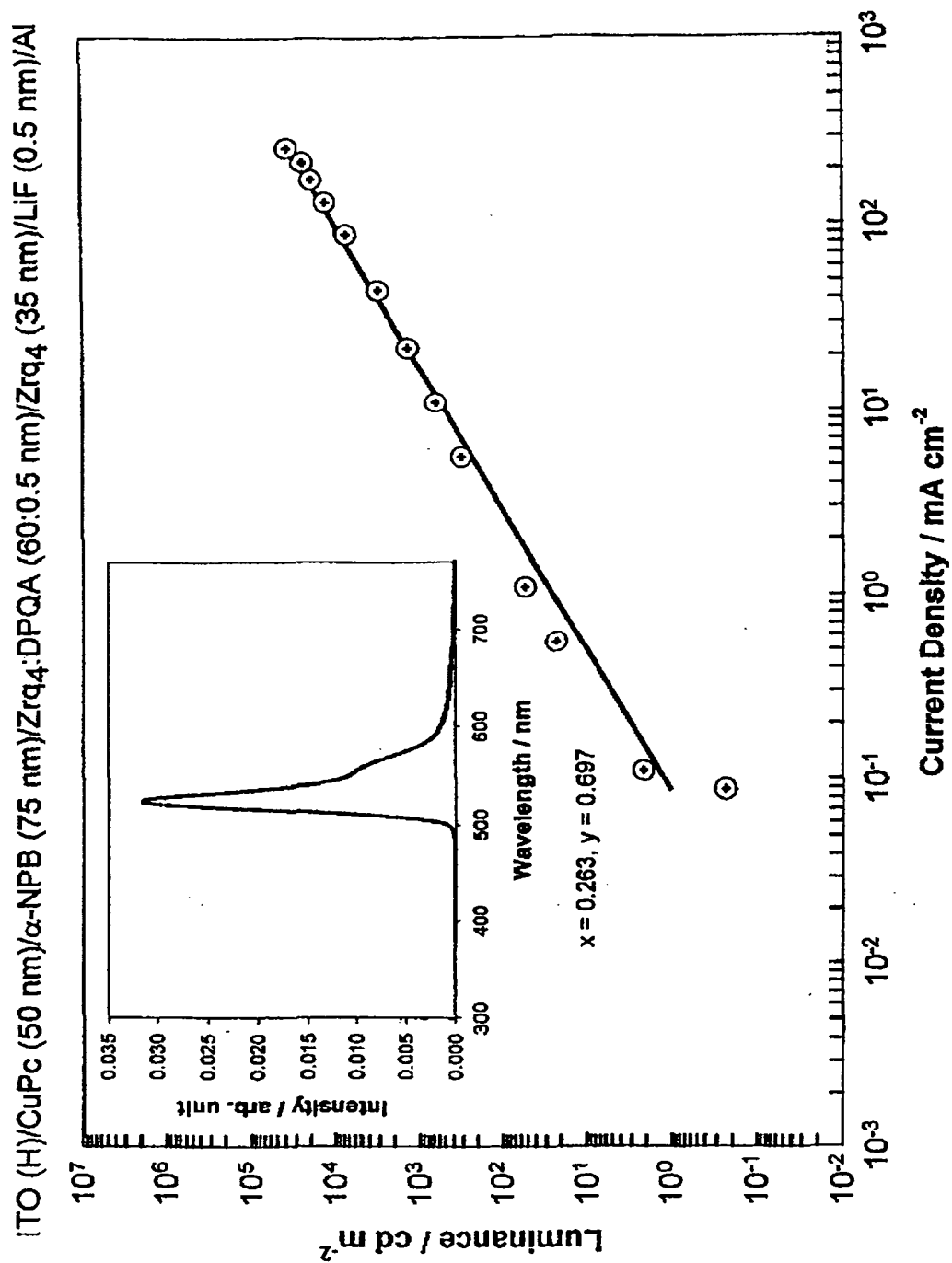


Fig. 33

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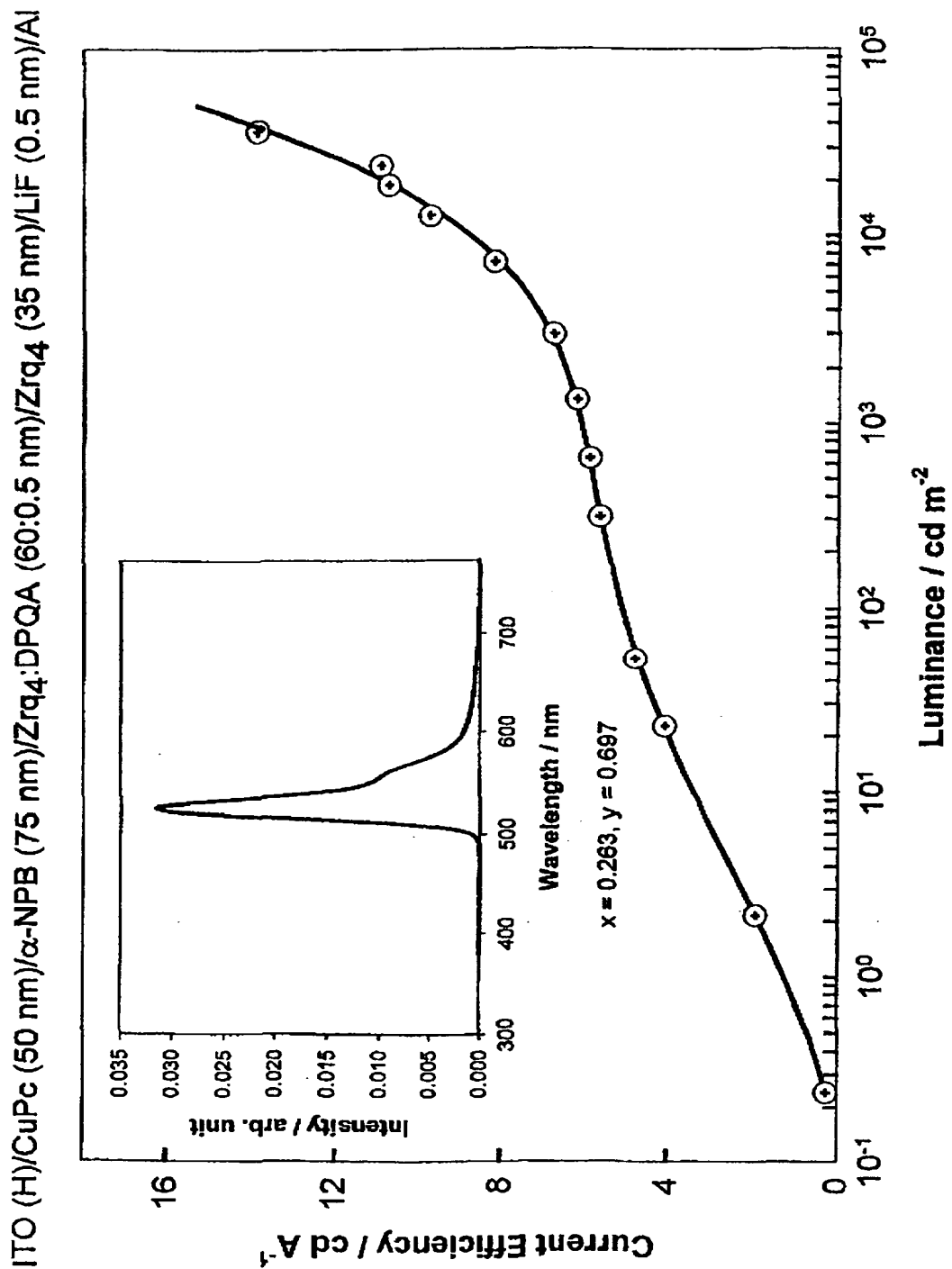


Fig. 34

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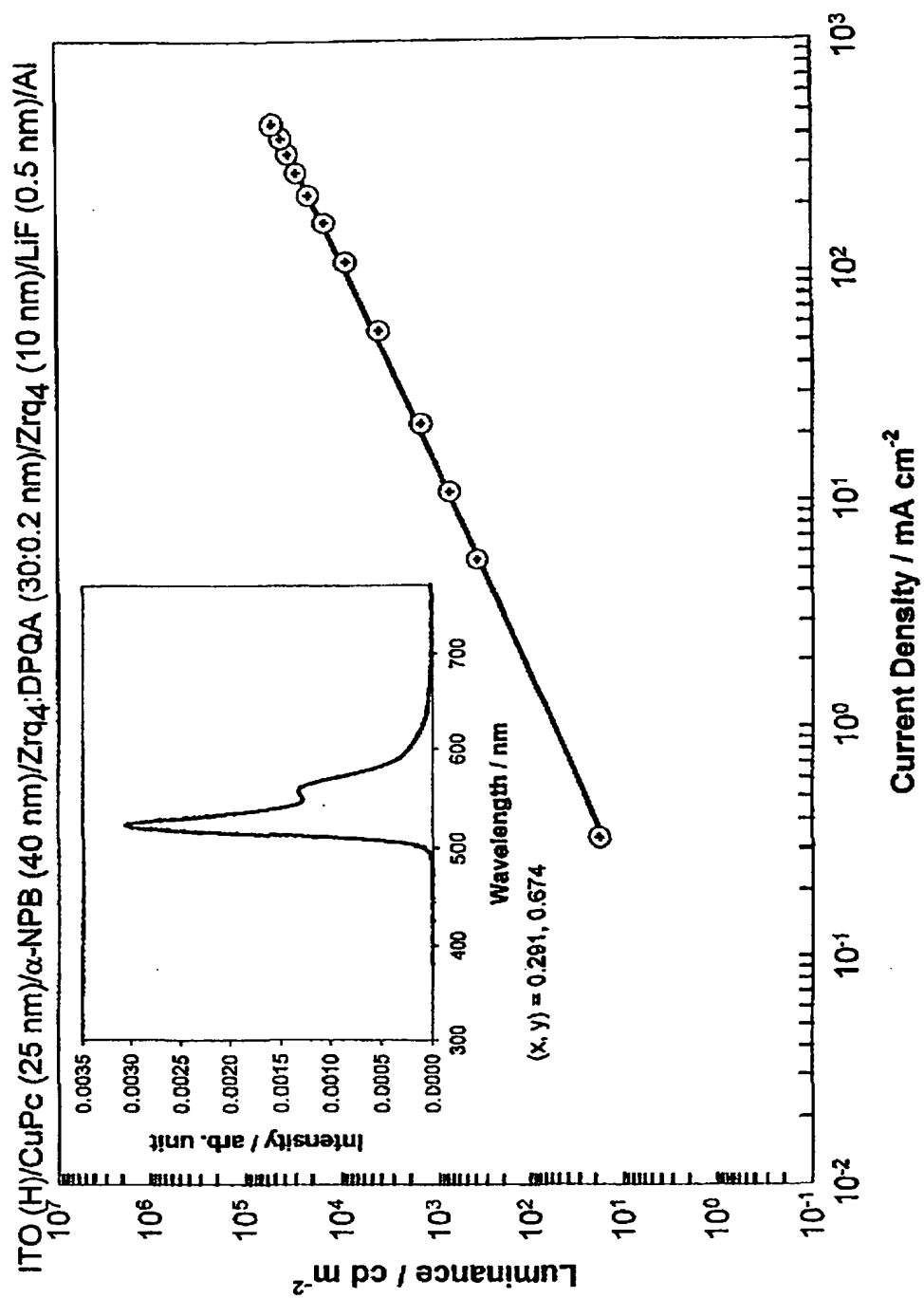


Fig. 35

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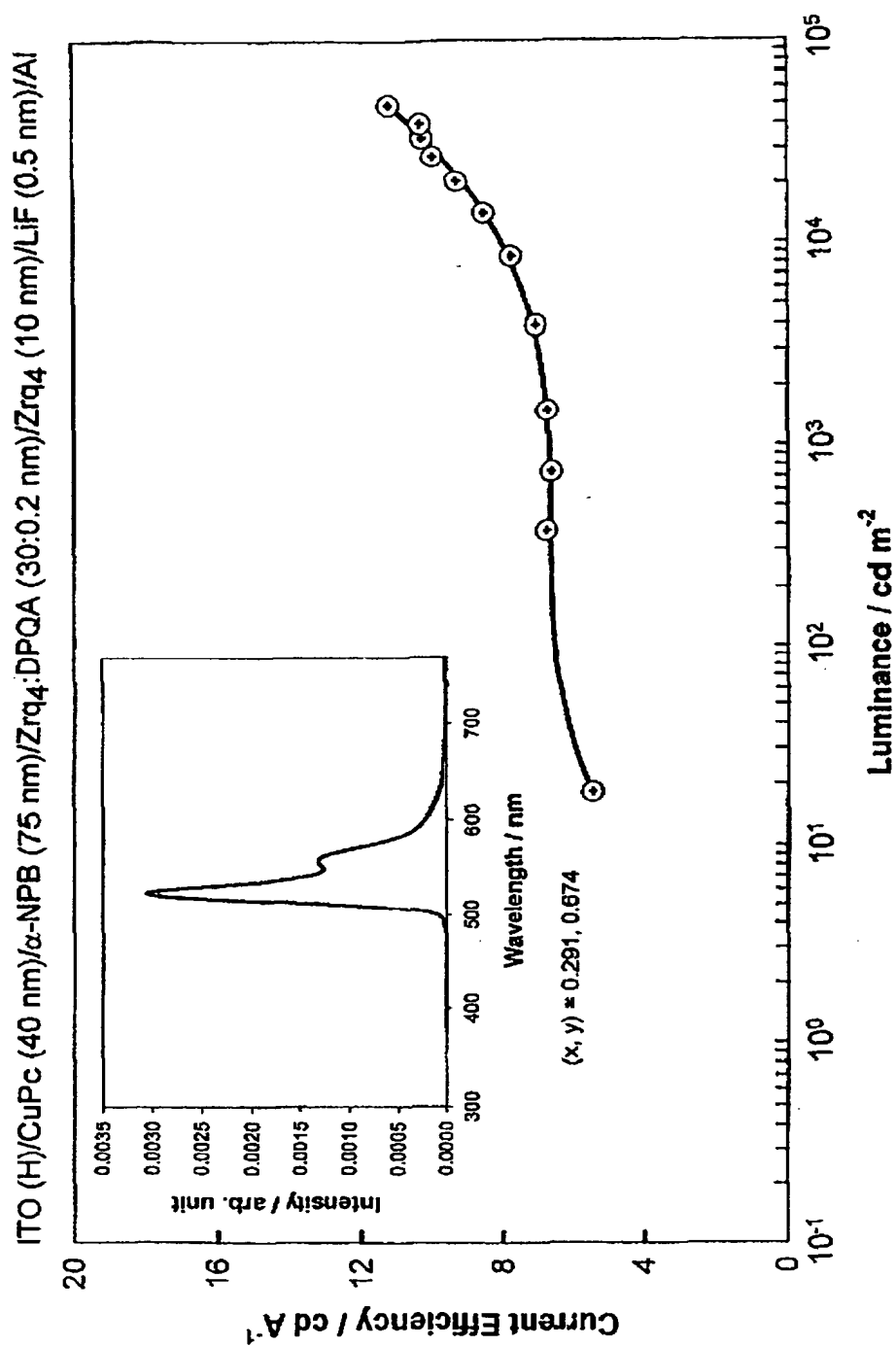
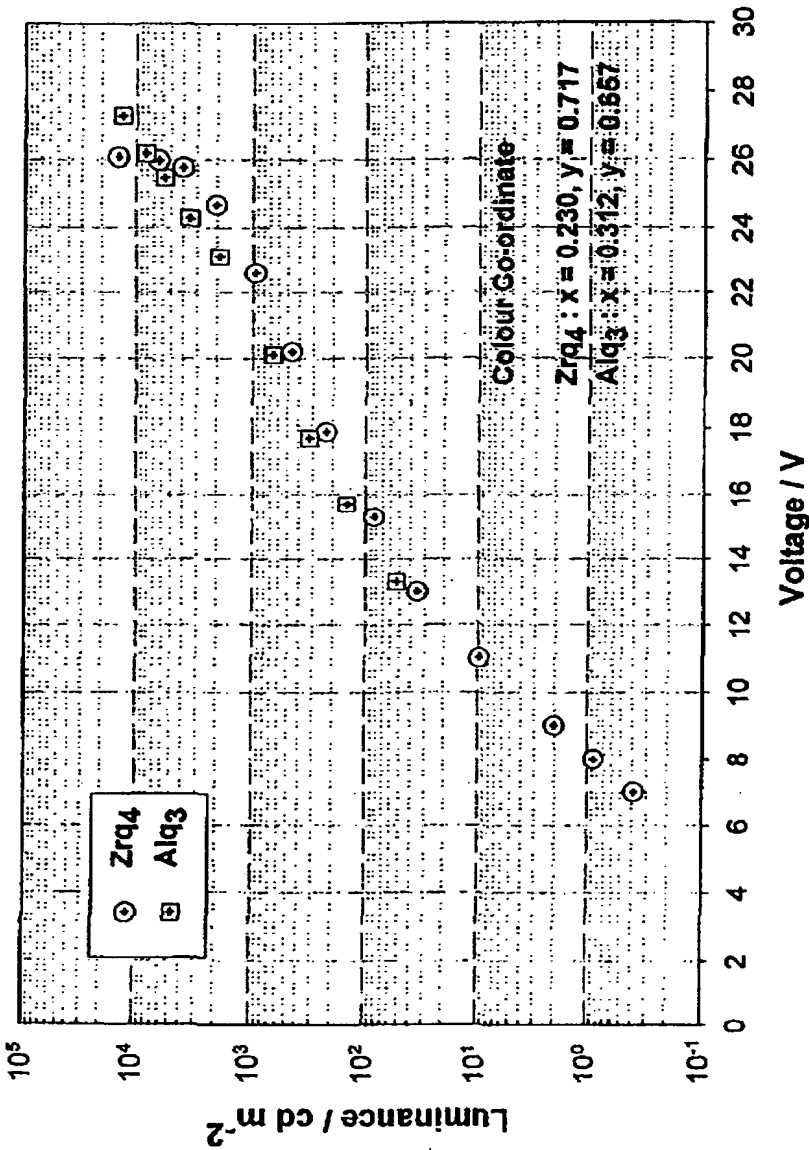


Fig. 36

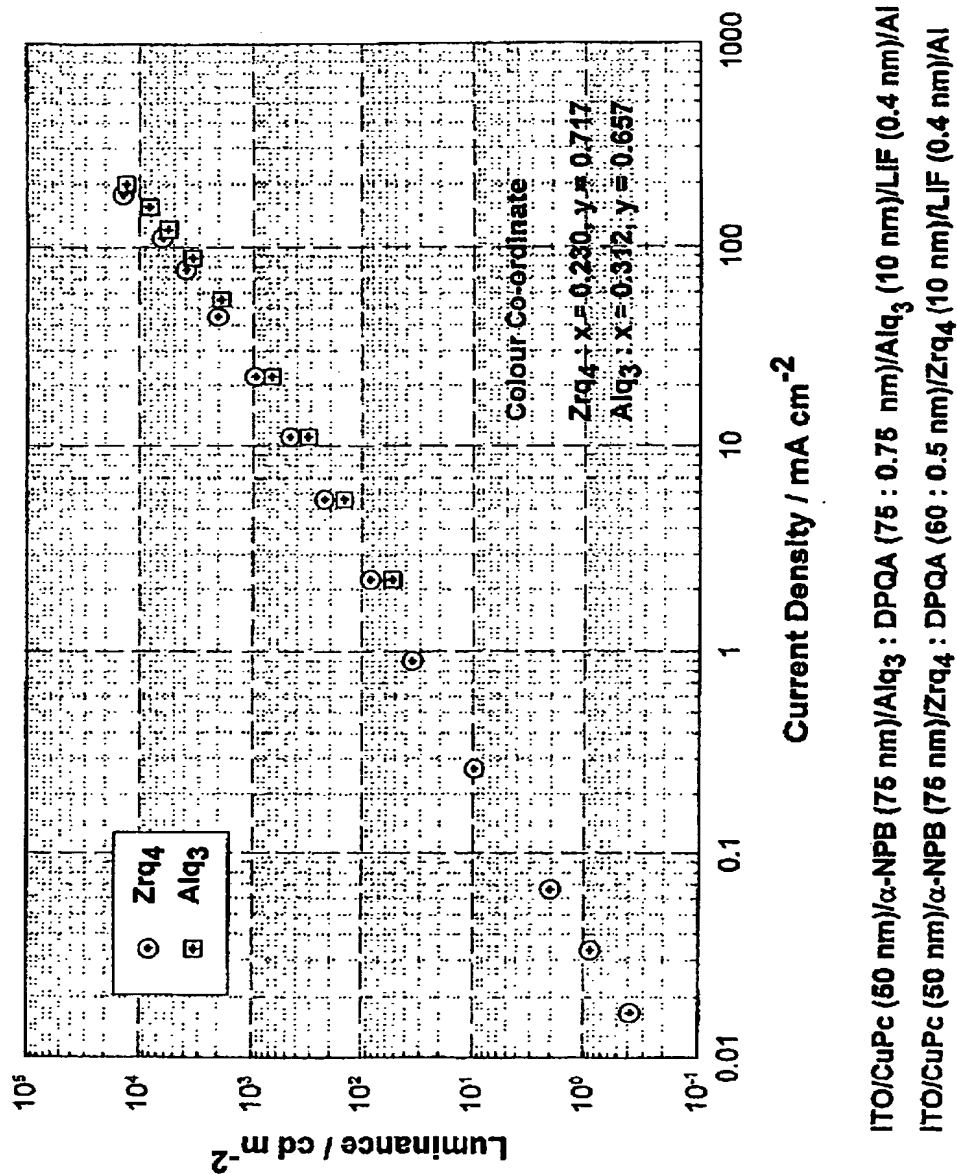
Comparison of Doped Zrq4 Device with Doped Alq3 Device



ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq3 : DPQA (75 : 0.75 nm)/Alq3 (10 nm)/LIF (0.4 nm)/Al
ITO/CuPc (50 nm)/ α -NPB (75 nm)/Zrq4 : DPQA (80 : 0.8 nm)/Zrq4 (10 nm)/LIF (0.4 nm)/Al

Fig. 37

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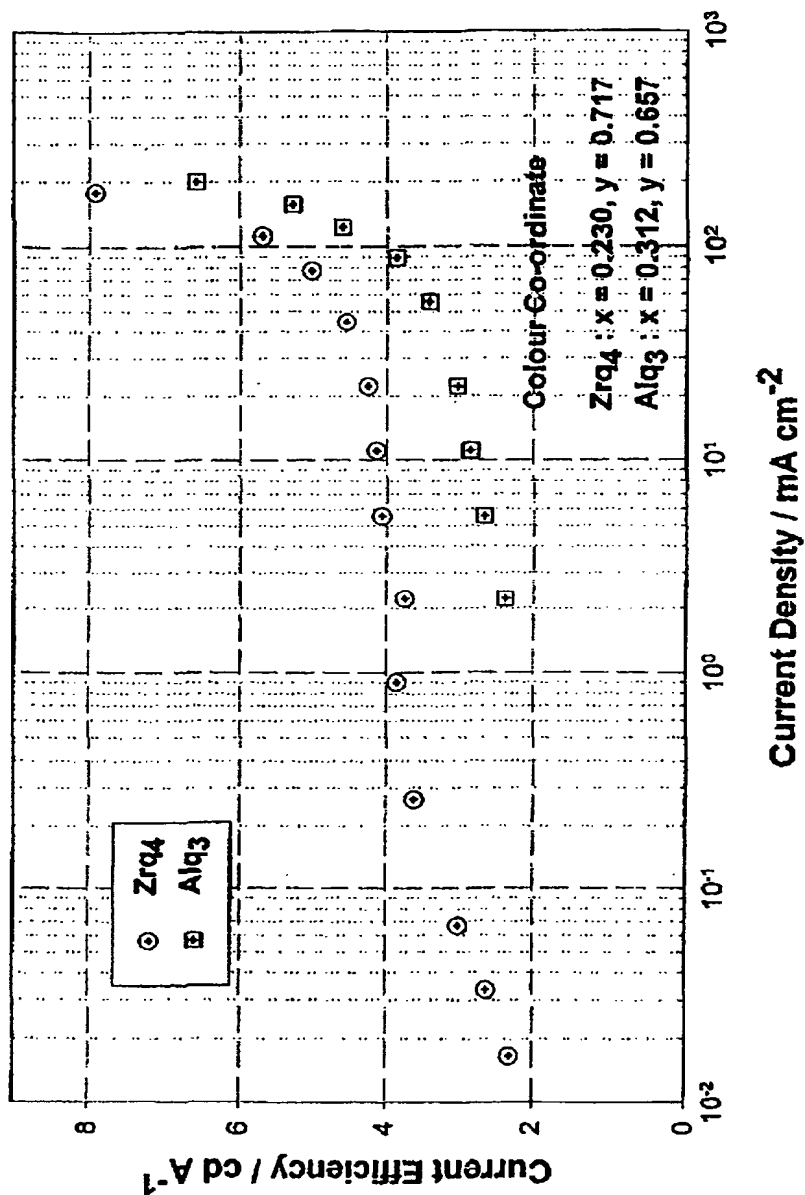
Comparison of Doped Zrq₄ Device with Doped Alq₃ Device

ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃ : DPQA (75 : 0.75 nm)/Alq₃ (10 nm)/LIF (0.4 nm)/Al
 ITO/CuPc (50 nm)/ α -NPB (75 nm)/Zrq₄ : DPQA (60 : 0.5 nm)/Zrq₄ (10 nm)/LIF (0.4 nm)/Al

Fig. 38

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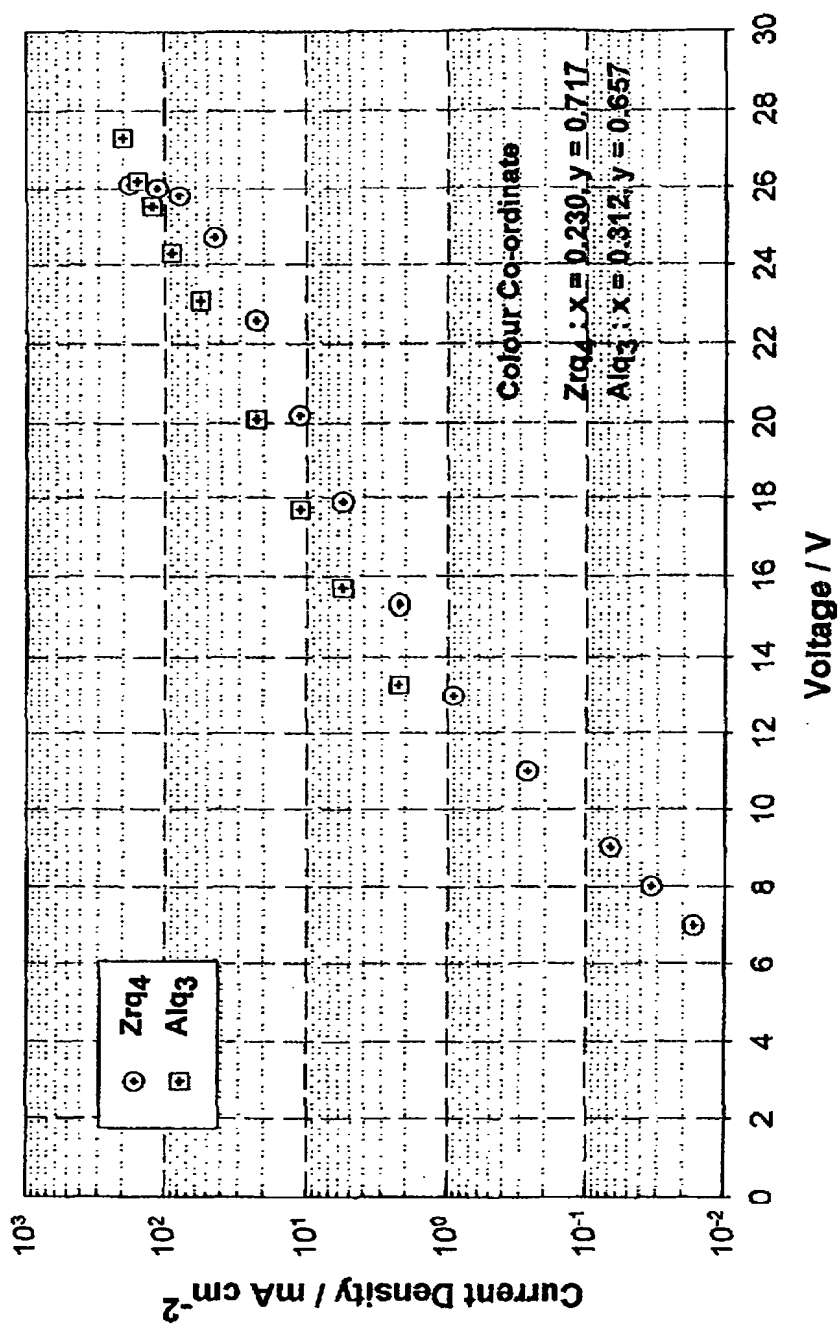
Comparison of Doped Zrq4 Device with Doped Alq3 Device



ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq3 : DPQA (75 : 0.75 nm)/Alq3 (10 nm)/LiF (0.4 nm)/Al
 ITO/CuPc (50 nm)/ α -NPB (75 nm)/Zrq4 : DPQA (60 : 0.5 nm)/Zrq4 (10 nm)/LiF (0.4 nm)/Al

Fig. 39

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Comparison of Doped Zrq₄ Device with Doped Alq₃ Device

ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃ : DPQA (75 : 0.75 nm)/Alq₃ (10 nm)/LiF (0.4 nm)/Al
 ITO/CuPc (50 nm)/ α -NPB (75 nm)/Zrq₄ : DPQA (60 : 0.5 nm)/Zrq₄ (10 nm)/LiF (0.4 nm)/Al

Fig. 40

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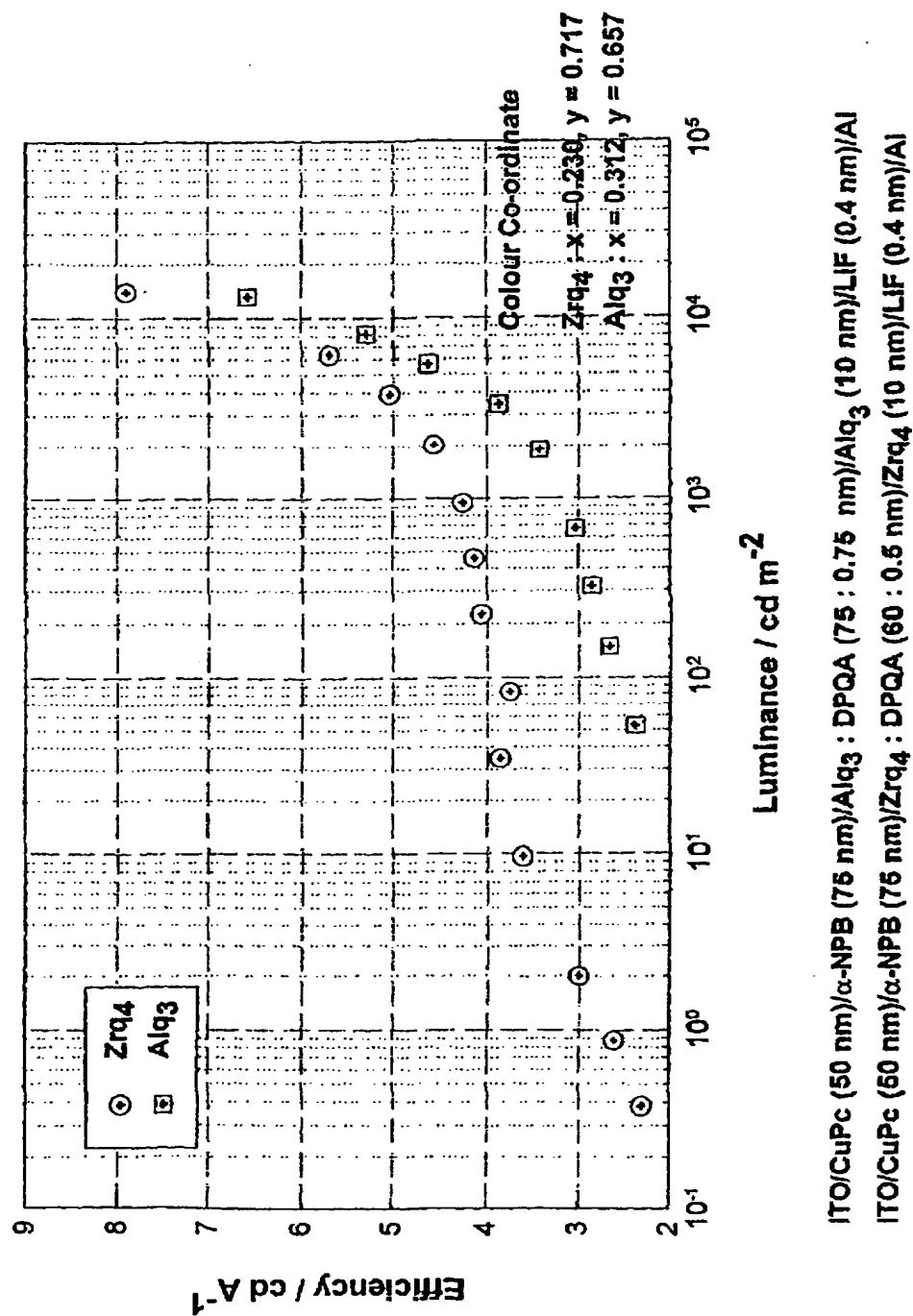
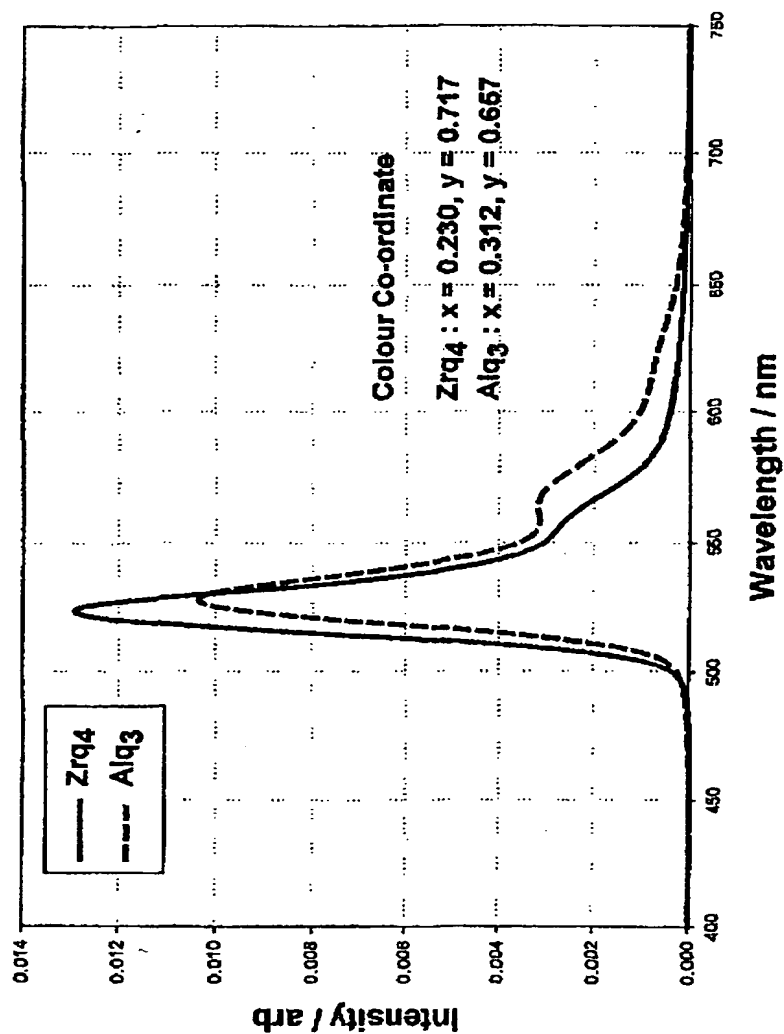
Comparison of Doped Zrq₄ Device with Doped Alq₃ Device

Fig. 41

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Comparison of Doped Zrq₄ Device with Doped Alq₃ Device

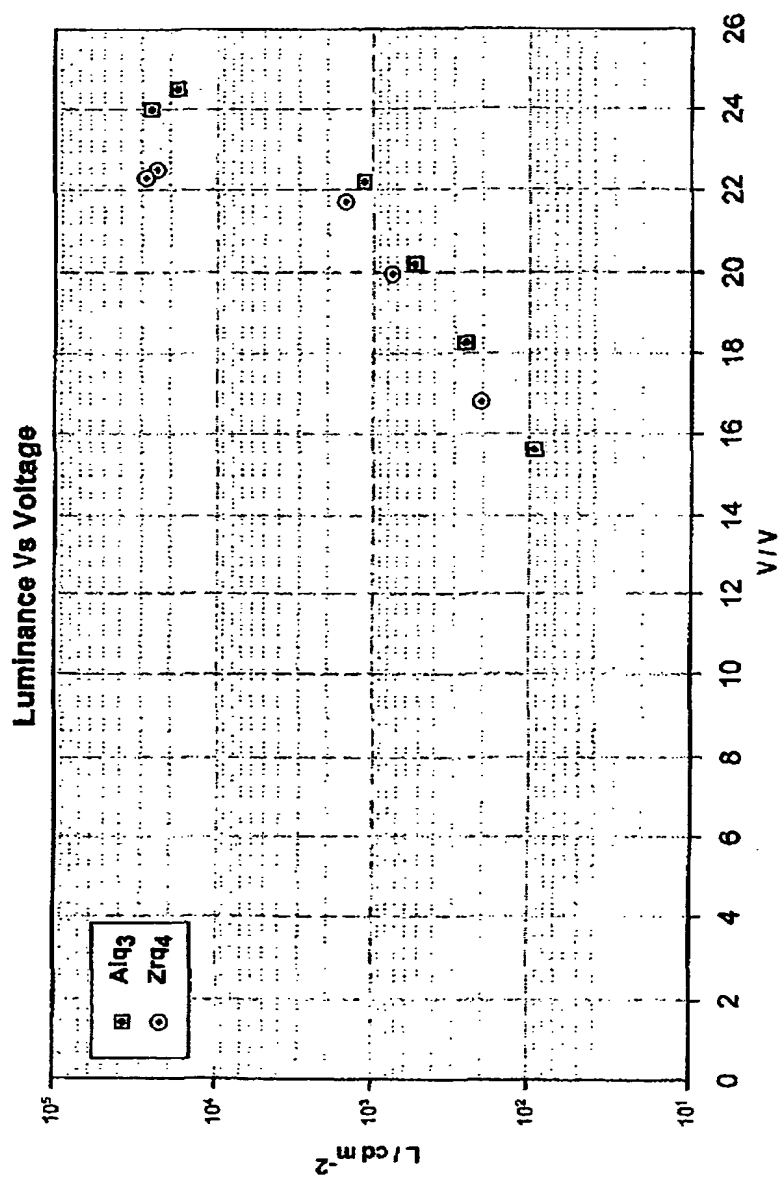
ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃ : DPQA (75 : 0.75 nm)/Alq₃ (10 nm)/LiF (0.4 nm)/Al

ITO/CuPc (50 nm)/ α -NPB (75 nm)/Zrq₄ : DPQA (60 : 0.5 nm)/Zrq₄ (10 nm)/LiF (0.4 nm)/Al

Fig. 42

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Comparison of Doped Alq₃ Device with Doped Zrqr₄ Device



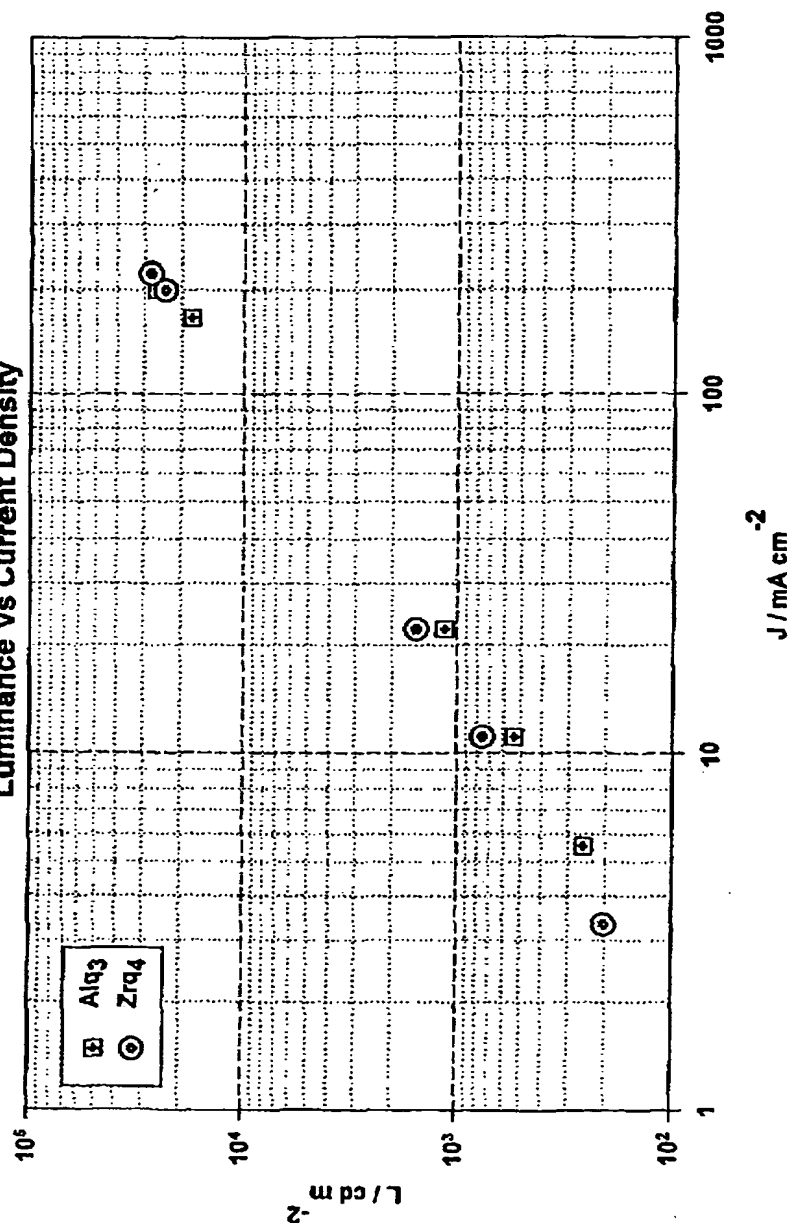
ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
 ITO/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Zrqr₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 43

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Comparison of Doped Alq₃ Device withDoped Zrqa₄ Device

Luminance Vs Current Density



ITO/CuPc (50 nm)/α-NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
 ITO/CuPc:TTP (15:15 nm)/α-NPB (75 nm)/Zrqa₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 44

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Comparison of Doped Alq₃ Device with Doped Zrqa₄ Device

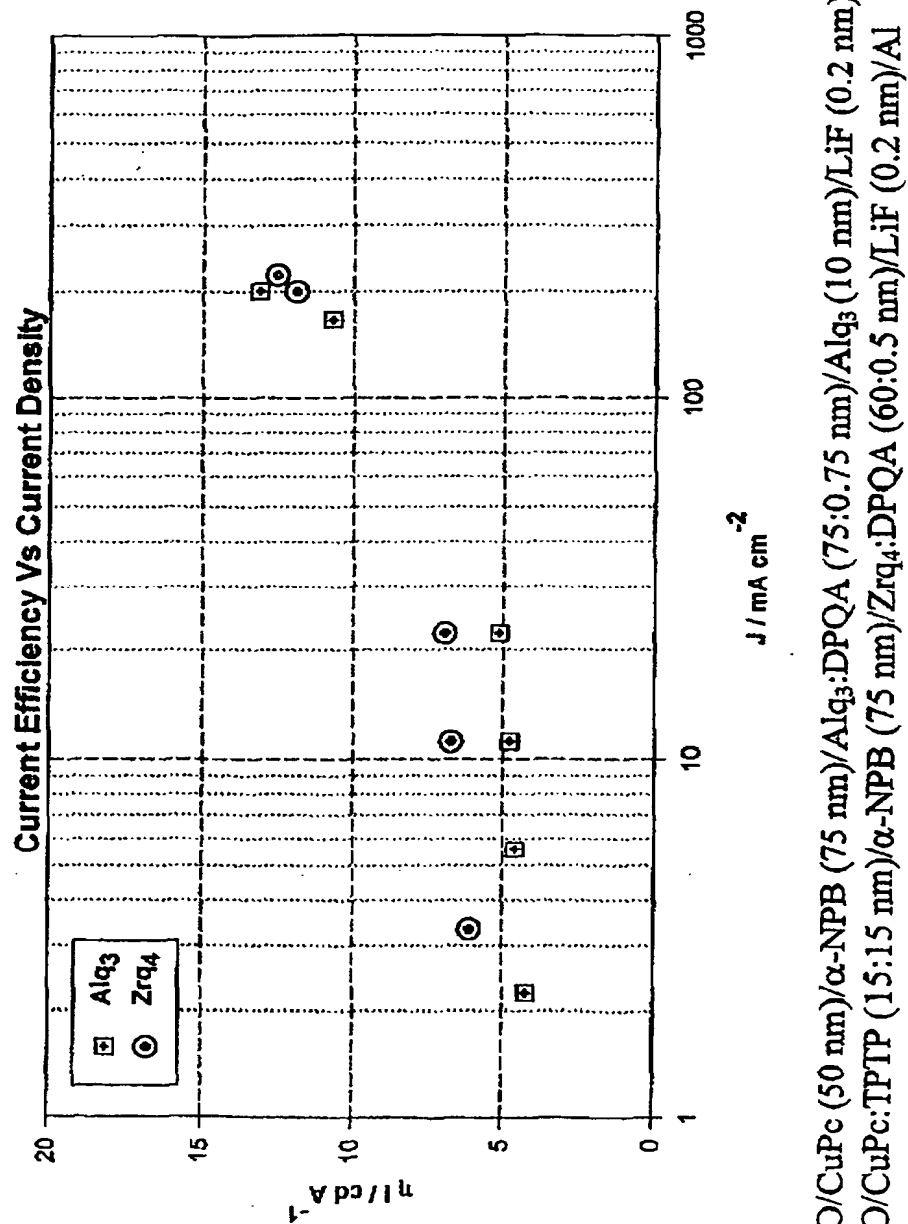
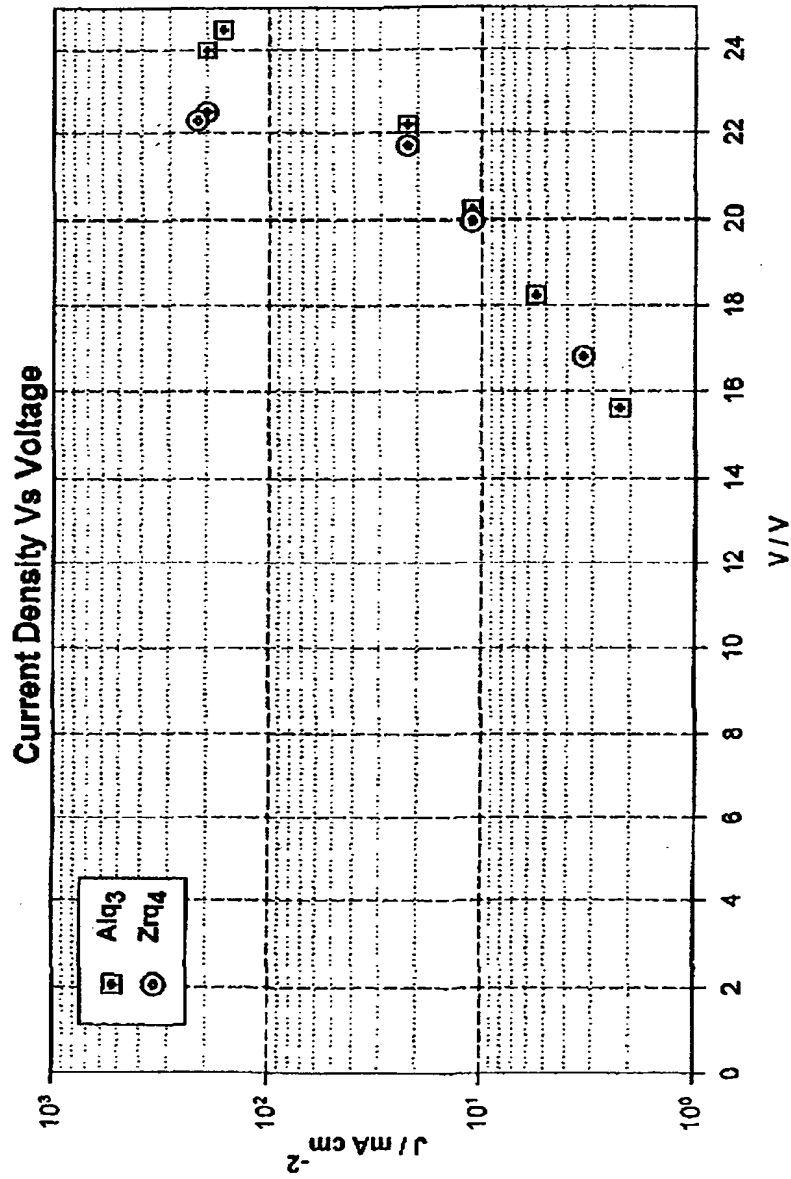


Fig. 45

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Comparison of Doped Alq₃ Device with Doped Zr_q4 Device

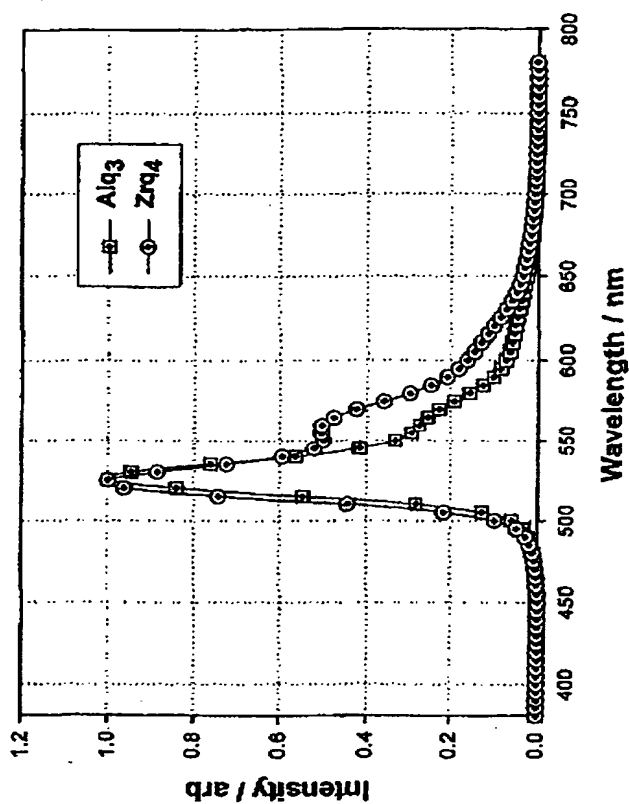


ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
 ITO/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Zr₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 46

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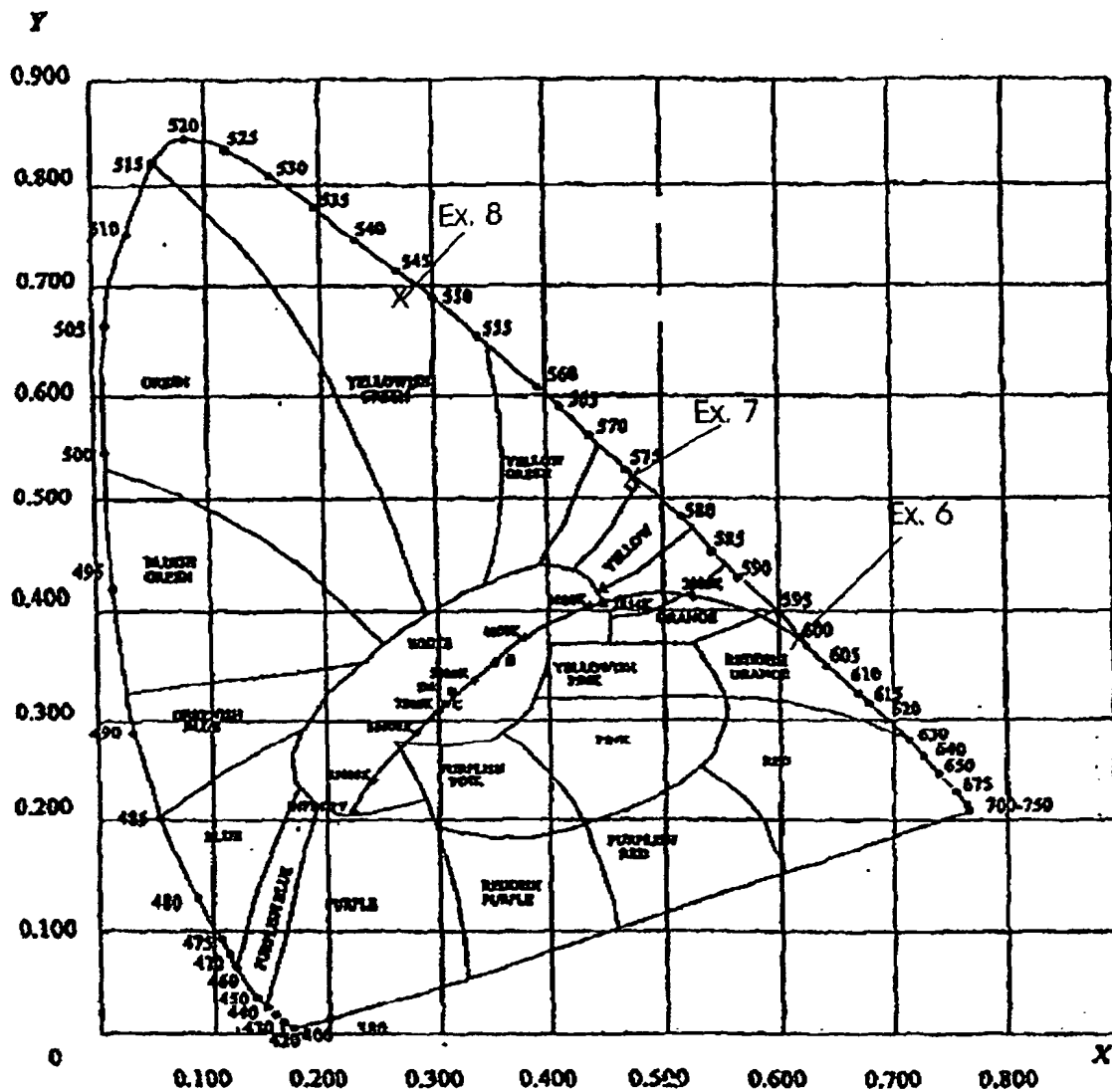
Comparison of Doped Alq₃ Device with Doped Zrq₄ Device



ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
 ITO/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Zrq₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 47

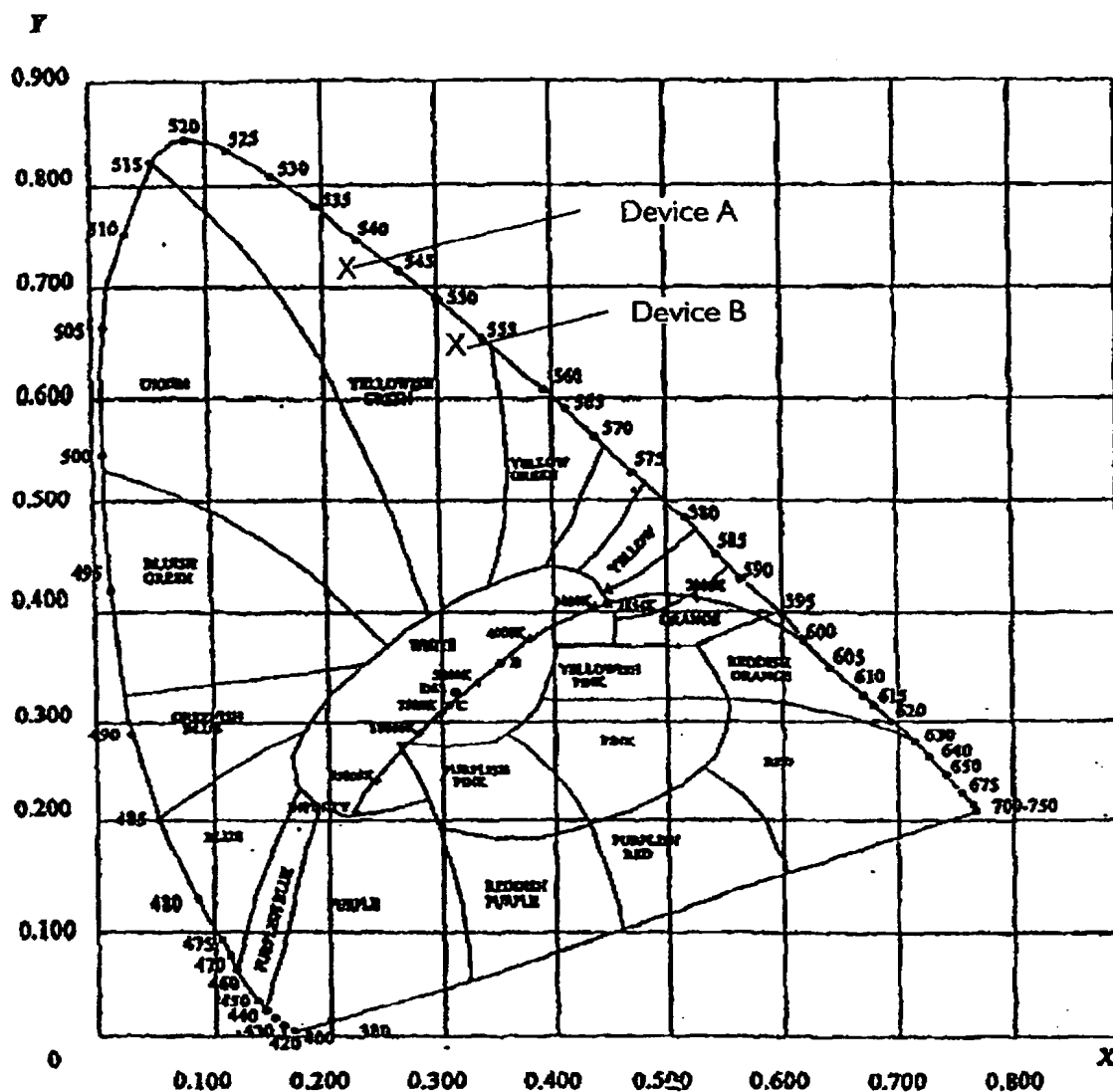
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CIE 1931 x,y chromaticity diagram showing approximate position of perceived colours

Fig. 48

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CIE 1931 x,y chromaticity diagram showing approximate position of perceived colours

Fig. 49

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